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13. ABSTRACT (Maximum 200 words) This paper summarizes hospitalization rates and trends, injury hospitalizations relative to other diagnoses, and injury hospitalizations by external cause of injury. Hospitalization rates in the Army increased 8% between 1981 and 1994, to a rate of 153/1,000 personnel/year. For the years 1989-1994, both the Navy and Marine Corps saw declines in hospitalization rates; the Navy rate declined 24% to 71/1,000 personnel/year, whereas the Marine Corps rate fell 27% to 61/1,000 personnel/year. Between 1980 and 1994, the Air Force hospitalization rate declined 35% to 100/1,000 personnel/year. Musculoskeletal conditions, which are frequently the result of injuries, were the leading cause of hospitalizations in the Army (18%), Navy (22%), and Marine Corps (28%) in 1994. Digestive conditions constituted the largest proportion of hospitalizations in the Air Force in 1994; however, musculoskeletal conditions and injury together accounted for 22% of hospitalizations that year.			
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CHAPTER 5

HOSPITALIZATIONS DUE TO INJURY: INPATIENT MEDICAL RECORDS DATA

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Section I. Description of Hospitalization Admission Databases

5-1. Introduction

Each military service maintains an inpatient medical records database that routinely collects and manages information on admissions to their military hospitals during peacetime.

- Army. The hospitalization medical records database, the Individual Patient Data System (IPDS), is managed by the Directorate of Patient Administration Systems and Biostatistics Activity (PASBA), U.S. Army Medical Department Center and School in San Antonio, Texas.
- Navy. The hospitalization medical records database is managed by the Naval Medical Information Management Center (NMMIC) in Bethesda, Maryland.
- Air Force. The hospitalization medical records database is managed by the Air Force Medical Support Agency, Medical Information Systems Division (AFMSA/SGSI) in San Antonio, Texas.

Each military service uses its own database to document and provide hospitalization information as required by Department of Defense Instruction (DoDI) 6040.39 (Reporting of Inpatient Data). Each of these databases include:

- Demographic information such as age, race, gender, and military occupational specialty (MOS).
- Diagnoses using specific discharge diagnoses abstracted from the medical record and then coded according to the ICD-9 codes (see Appendix A, Table A-3).
- Injury type/cause using the STANAG 2050 coding system (see Appendix A, Table A-1).
- Non-effective days on the hospital rolls (i.e., in a hospital bed or on convalescent leave).
- Non-military hospitalizations to capture active duty personnel hospitalized in civilian hospitals.

5-2. Mission

The mission of the administrative organizations that maintain these databases is to operate their respective inpatient medical data collection system in support of DoD and the military service medical departments.

5-3. Purpose

The primary purpose of the hospitalization databases is administrative and includes:

- Patient tracking.
- Provision of information to effectively manage medical resources and efficiently distribute workload.
- Foundation to support future medical planning.

A secondary purpose is the support of medical research, including epidemiological studies. These databases have great potential value for routine medical and injury surveillance which would help to identify trends and high-risk groups and to develop appropriate intervention and prevention strategies.

Since 1989, hospitalization data have been standardized across services by the Standard Inpatient Data Record (SIDR). Although the hospitalization databases were not specifically implemented for the purpose of injury surveillance or prevention, their completeness and standardization fulfills many of the requirements for such a purpose.

5-4. Authority

The authority for collecting hospital data comes from DoDI 6040.39 from which all services generate appropriate directives. Each service may have additional requirements as outlined in their own governing instructions, manuals, or orders.

- Army.
 - Patient Administration (AR 40-400).
- Air Force.
 - AF Policy Directive 41-1, Health Care Programs and Resources.
 - AF Policy Directive 41-2, Medical Support.
 - AF Policy Directive 41-210, Patient Administration Functions.

In addition, there are special forms designed to standardize the data collection:

- Army.
 - Clinical Record, Narrative Summary (SF 502).
 - Clinical Record, Autopsy Protocol (SF 503).
 - Clinical Record, History—Part 1 (SF 504).
 - Clinical Record, Doctor's Progress Notes (SF 509).
 - Hospital Report of Death (DA Form 3894) which is used in hospitals to describe the chain of events leading to death.
 - Inpatient Treatment Record Cover Sheet (DA Form 3647) which includes the diagnosis describing the underlying cause of death.
- Air Force.
 - Authorization and Treatment Statement (AF 560).
 - AF 275 or SFs 502 to 509, as above.
 - Cover Sheet for Patient Record (AF 565).

5-5. Comparison of the Minimum Basic Data Set Variables and Service Hospitalization Databases

Each service identified their database's hospitalization variables for *unintentional injuries* using the questionnaire discussed in Chapter 1 (see pages 1-23 through 1-27). These variables were compared to the MBDS for unintentional injury surveillance recommended by Lund, Holder, and Smith.* A comparison is presented in Table 5-1.

The services were not asked to identify their database's hospitalization variables for *intentional injuries*.† Additional data that would be required to satisfy the MBDS for intentional injuries include circumstances or motive surrounding injury event, drugs or alcohol involved, weapon(s) involved, relationship and demographics of victim and perpetrator, and source of data.

¹ Lund J., Y. Holder, and R.J. Smith. Minimum Basic Data Set, Unintentional Injuries. *Proceedings of the International Collaborative Effort on Injury Statistics*, 1:34-1 to 34-4, 1994.

² Powell, K. and J. Kraus. Minimum Basic Data Set, Intentional Injuries. *Proceedings of the International Collaborative Effort on Injury Statistics*, 1:35-1 to 35-2, 1994.

Table 5-1. Comparison of the Recommended Elements for the Minimum Basic Data Set for Unintentional Injury Surveillance and Their Availability from Service Hospitalization Databases

Variables	Army Patient Administration Systems and Biostatistics Activity (PASBA)	Naval Medical Information Management Center (NMIMC)	Air Force Medical Support Agency, Medical Information Systems Division (AFMSA/SGSI)
Intent*	Y	Y	Y
Age of Injured*	Y	Y	Y
Gender*	Y	Y	Y
Race*	Y	Y	Y
Place of Residence*	NS	NS	NS
Date of Injury Event*	N	N	N
Place of Occurrence (on/off duty)*	Y	N	Y
Address of Place of Occurrence*	NS	NS	NS
Activity when Injury Occurred*	Y	N	Y
Mechanism of Accident/Event*	Y	N	Y
Type of Injury/Body Location*	Y	Y	Y
Outcome of Injury			
Type of Treatment†	Y	Y	Y
Dates of Treatment†	N	U	Y

Table 5-1.—Continued

Variables	Army - Patient Administration Systems and Biostatistics Activity (PASBA)	Naval Medical Information Management Center (NMIMC)	Air Force Medical Support Agency, Medical Information Systems Division (AFMSA/SGSI)
Date Admitted to Hospital†	Y	Y	Y
Date Discharged from Hospital†	Y	Y	Y
Nature of Disability†	N	U	N
Degree of Disability (fit for duty, temporary disability retirement list, etc.)†	N	U	N
Severity of Injury†	Y	U	N
Days of Limited Duty†	N	U	N
Days in Hospital†	Y	Y	Y
Costs of Treatment†	Y	U	Y

Y = available in database.

N = not in database.

U = unknown; response not provided on questionnaire.

NS = not solicited on questionnaire.

* Recommended variables for databases designed for unintentional injury surveillance (Lund J., Y. Holder, and R.J. Smith. Minimum Basic Data Set, Unintentional Injuries. *Proceedings of the International Collaborative Effort on Injury Statistics*, 1:34-1 to 34-4, 1994).

† Example of an outcome variable deemed appropriate for databases with potential for surveillance of unintentional injuries to U.S. active duty military personnel.

Section II. Hospitalization Data: Injuries and Other Causes of Hospitalization

5-6. Army

The Army hospitalization data are presented in four parts:

- The Army Summary. The Army hospitalization data presented in this section are summarized in three tables.
 - The overall summary is presented in Table 5-2.
 - The data in figures 5-1 and 5-2 are summarized in Table 5-3.
 - The data in figures 5-10, 5-12, and 5-13 are summarized in Table 5-4.
- Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.
 - The distribution of hospitalizations and non-effective days due to hospitalization by principal diagnosis group for CY 1994 are displayed in figures 5-1 and 5-2, respectively.
 - The distribution of top 10 injuries and musculoskeletal system diseases by ICD-9 codes for hospitalized personnel for CY 1994 are displayed in figures 5-3 and 5-4, respectively.
- Trends of Army Total Hospitalizations Over Time.
 - The rates of hospitalization by year for CY 1981-1994 are displayed in Figure 5-5.
 - The rates of hospitalization by top 10 principal diagnosis groups for all personnel, men, and women for CY 1981-1994 are displayed in figures 5-6, 5-7, and 5-8, respectively.
 - The rates of hospitalization for musculoskeletal system diseases and injuries by principal diagnosis group for men and women for CY 1981-1994 are displayed in Figure 5-9.
 - The frequency, case rates, and non-effective rates (NERS) by principal diagnosis group for hospitalized men and women for CY 1994 are displayed in Table 5-5.

- Hospitalization by External Cause of Injury.
- The distribution of hospitalizations by external cause of injury for CY 1994 is displayed in Figure 5-10.
- The rates and NERs for hospitalization by external cause of injury for CY 1981-1994 are displayed in figures 5-11, 5-12, and 5-13.
- The frequency, case rates, NERs by external cause of injury for hospitalized men and women for CY 1994 are displayed in Table 5-6.

In addition, Operations Desert Shield and Storm hospitalization data for 1 August 1990 - 31 July 1991 are presented in Supplement A.

The Army Summary.

Table 5-2. Overall Summary of Army Hospitalization Data for Active Duty Personnel

Year	Army Population	Hospitalizations		Rates and Trends of Hospitalizations			Conclusion
		Total	n/1,000 Personnel /Year	n/1,000 Personnel /Year	Trend, % Change (CY 1981-1994)		
CY81-94	—	—	—	142 (CY81) —	153 (CY94) —	Up 8% —	Rates remained relatively constant.
CY94	550,107	84,086	153	—	—	—	

Denominator Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Table 5-3. Summary of Army Hospitalization Distribution Data by Principal Diagnosis Group, CY 1994

Principal Diagnosis Groups	ICD-9 Codes	Distribution (%)		Conclusions
		Hospitalizations (n = 84,086)	Non-Effective Days (n = 802,400)	
Musculoskeletal System	710-739	18%	23%	Musculoskeletal System <ul style="list-style-type: none">Musculoskeletal system diseases, which are largely late, recurrent, or chronic effects of injuries, were the leading cause of hospitalizations and hospitalization associated non-effective days in CY 1994.
Digestive System	520-579	12%	6%	Digestive System <ul style="list-style-type: none">Digestive system diseases were the second leading cause of hospitalization.
Injury	800-999	10%	12%	Injury <ul style="list-style-type: none">Injuries were the third leading cause of hospitalizations and hospital-related non-effective days.
Pregnancy	630-676	9%	8%	
Respiratory System	460-519	9%	4%	
Mental Disorders	290-319	8%	18%	Mental Disorders <ul style="list-style-type: none">Interestingly, the second leading cause of hospitalization associated non-effective days was mental disorders even though mental disorders were only the sixth cause of hospitalization.
Genitourinary System	580-629	5%	3%	
Infectious & Parasitic	001-139	5%	3%	
V Codes*	V01-V82	4%	3%	
II-Defined Conditions	780-799	4%	3%	
Other (includes groups less than 3% each)	—	16%	17%	

* Circumstances recorded as diagnoses or problems, but not classified as a disease, injury, or E code.

Table 5-4. Summary of Army Hospitalization Data by External Cause of Injury, CY 1994

External Causes of Injury*	Distribution (%) of Hospitalizations (n = 13,002)	Rates Per 1,000 Personnel		Conclusions
		Hospitalizations	NER†	
Complications of Medical/Surgical Procedures	15%	3.6	0.19	• About one-third of external causes of hospitalization are due to late effects of injury or complications of medical/surgical procedures.
Late Effects of Injury	15%	3.5	0.21	• About two-thirds of external causes of hospitalization represent acute injuries.
Athletics/Sports Injuries	12%	2.8	0.07	• Athletics/sports injuries are the leading specific nonmedical cause of injuries.
Motor Vehicle Accidents	11%	2.6	0.18	• Motor vehicle accidents are the fourth leading cause of injury hospitalizations, but have the highest NER.
Falls/Jumps	8%	1.8	0.06	
Poisoning by Ingestion	5%	1.1	0.03	
Machinery/Tools	5%	1.1	0.03	
Cut/Pierce by Objects	4%	1.0	0.02	
Military Air Transport Accidents	—	0.9	0.02	
Fighting	—	0.7	0.02	
Unknown Causative Agent	6%	—	—	
Other (includes diagnoses accounting for less than 4%)	19%	—	—	

* NATO STANAG codes.

† Non-effective rate = number of persons on the hospital rolls per 1,000 personnel per year.

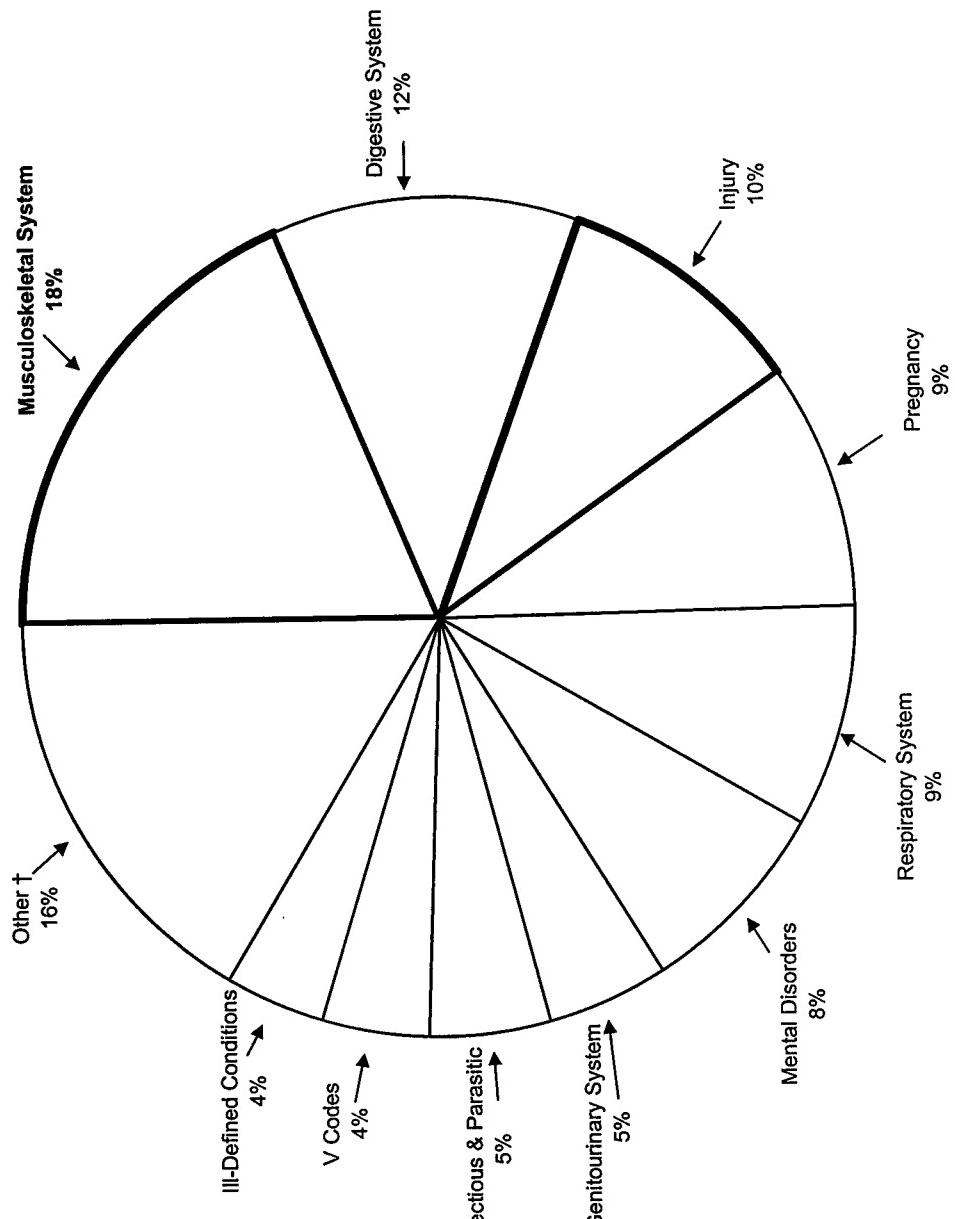
Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.

Figure 5-1 illustrates the distribution of 84,086 hospitalizations by principal diagnosis group for active duty Army personnel for CY 1994. The top five contributors to hospitalization were:

- Musculoskeletal system (ICD-9 codes 710-739)—18%.
- Digestive system (ICD-9 codes 520-579)—12%.
- Injury (ICD-9 codes 800-999)—10%.
- Pregnancy (ICD-9 codes 630-676)—9%.
- Respiratory system (ICD-9 codes 460-519)—9%.

When hospitalizations coded under the musculoskeletal system and injury diagnosis groups are combined to fully examine the contribution of injuries to total hospitalizations, it is evident that injury-related events may account for nearly 30% of all hospitalizations.

Army - Distribution (%) of Hospitalizations by Principal Diagnosis Group,* CY 1994



n = 84,086

* Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

† Other includes diagnosis groups accounting for less than 3% each.

Source: Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-1

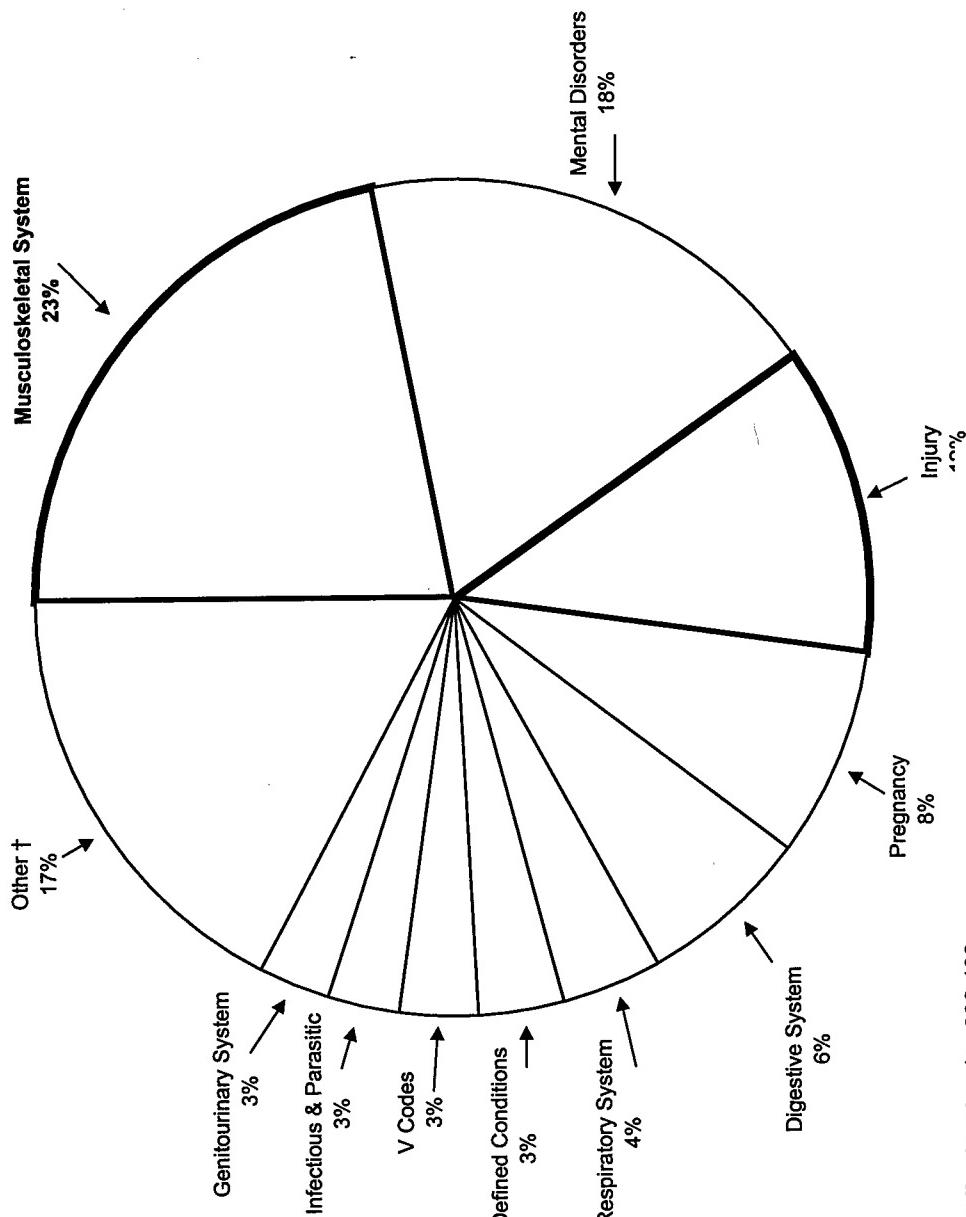
Figure 5-2 illustrates the distribution of non-effective days due to hospitalization by principal diagnosis group for active duty Army personnel for CY 1994. The total number of non-effective days was approximately 802,400.

The number of non-effective days are routinely converted to NERs, which provide an indication of the impact of illness or injury. NERs are defined as the number of persons on the hospital rolls per 1,000 personnel per day and are a function of both the number of hospitalizations and the average length of hospital stays for any given group of diagnoses. The total NER for CY 1994 was 1,515.5 days per 1,000 personnel, with the following top five contributors to non-effective days:

- Musculoskeletal system (ICD-9 codes 710-739)—23%.
- Mental disorders (ICD-9 codes 290-319)—18%.
- Injury (ICD-9 codes 800-999)—12%.
- Pregnancy (ICD-9 codes 630-676)—8%.
- Digestive system (ICD-9 codes 520-579)—6%.

When musculoskeletal system and injury diagnosis groups are combined, it is likely that injury-related events account for 35% of all non-effective days.

Army - Distribution (%) of Non-Effective Days Due to Hospitalization by Principal Diagnosis Group,* CY 1994



n (approximate number of non-effective days) = 802,400.

* Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

† Other includes diagnosis groups accounting for less than 3%.

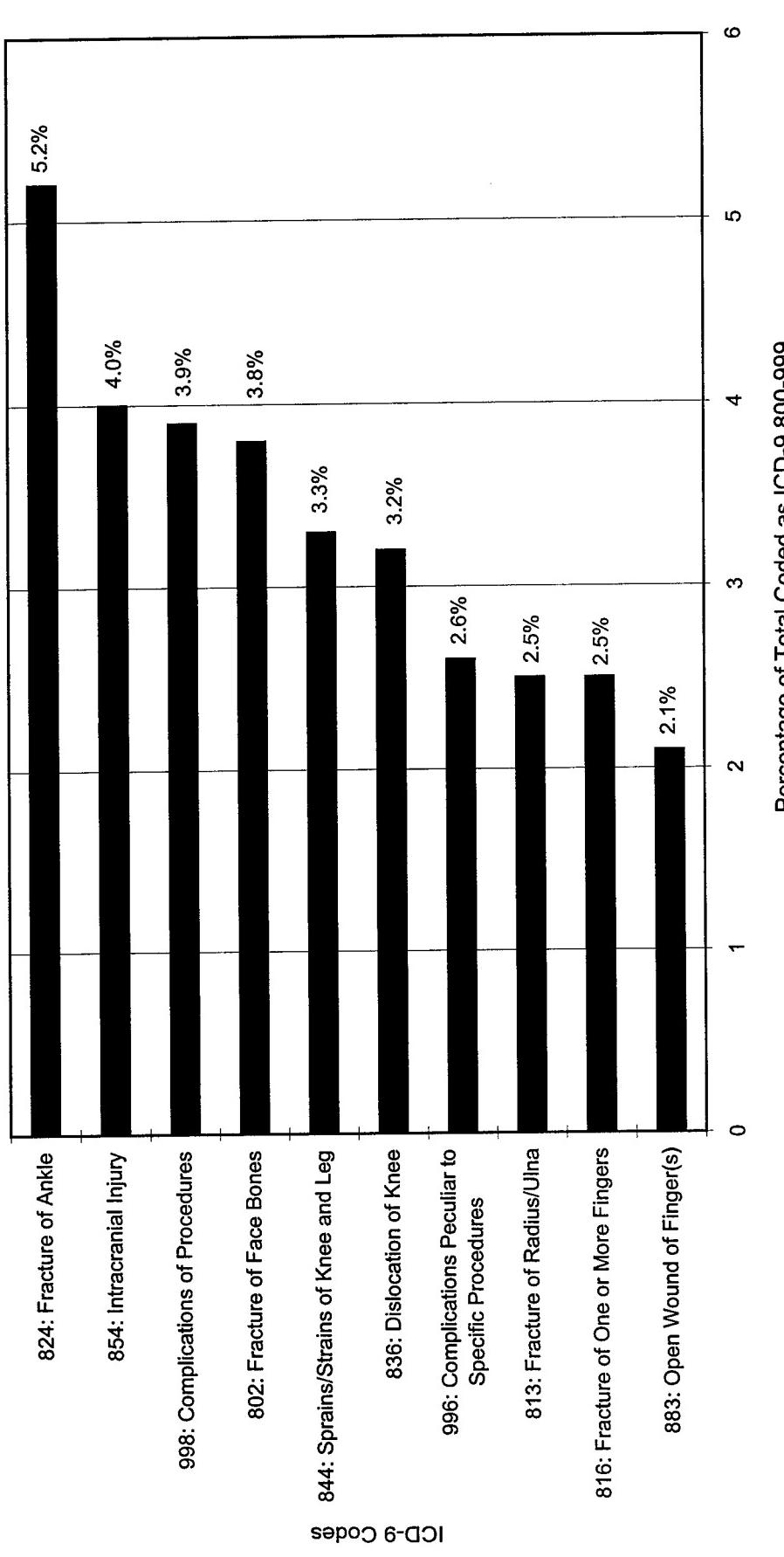
Source: Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-2

Figure 5-3 illustrates the distribution of the top 10 injuries (ICD-9 codes 800-999) for active duty Army hospitalized personnel for CY 1994. The top five contributors to injury hospitalization were:

- Fracture of the ankle—5.2%.
- Intracranial injury—4.0%.
- Other complications of medical or surgical procedures not elsewhere classified—3.9%.
- Fracture of the face bones—3.8%.
- Sprains and strains of the knee and leg—3.3%.

Army - Distribution (%) of the Top 10 Injuries* (ICD-9 Codes 800-999) for Hospitalized Personnel, CY 1994



n = 8,677.

* Top 10 injuries account for 33% of all injuries.

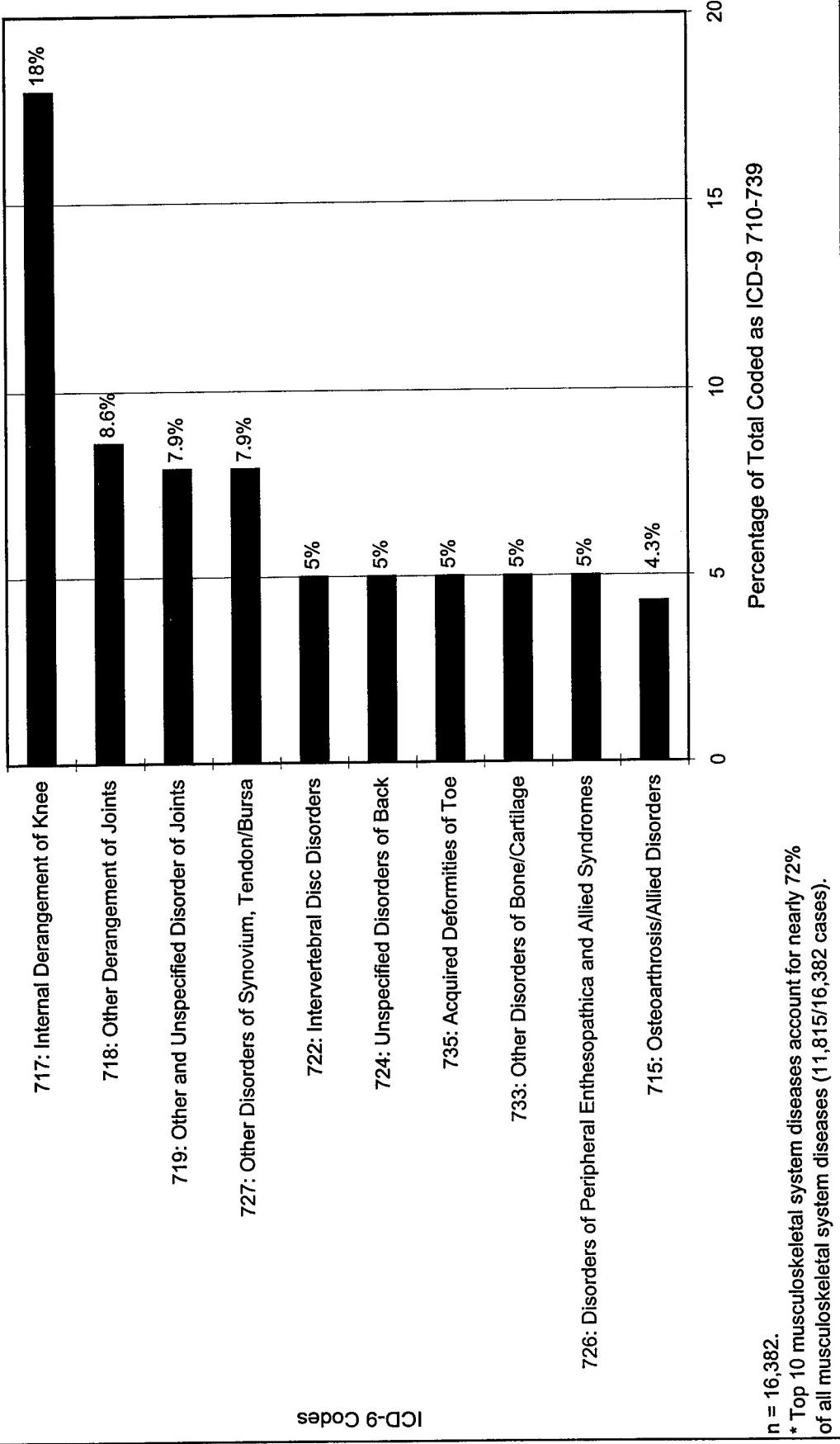
Source: Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-3

Figure 5-4 illustrates the distribution of the top 10 musculoskeletal system diseases (ICD-9 codes 710-739) for active duty Army hospitalized personnel for CY 1994. The top five contributors to hospitalization were:

- Internal derangement of the knee—18.0%.
- Other derangement of joints—8.6%.
- Other and unspecified disorders of joints—7.9%.
- Other disorders of synovium, tendon and bursa—7.9%.
- Intervertebral disc disorders, unspecified disorders of back, acquired deformities of toe, other disorders of bone and cartilage, and disorders of peripheral enthopathica and allied syndromes—5.0% each.

Army - Distribution (%) of the Top 10 Musculoskeletal System Diseases* (ICD-9 Codes 710-739) for Hospitalized Personnel, CY 1994



Source: Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-4

Trends of Army Total Hospitalizations Over Time.

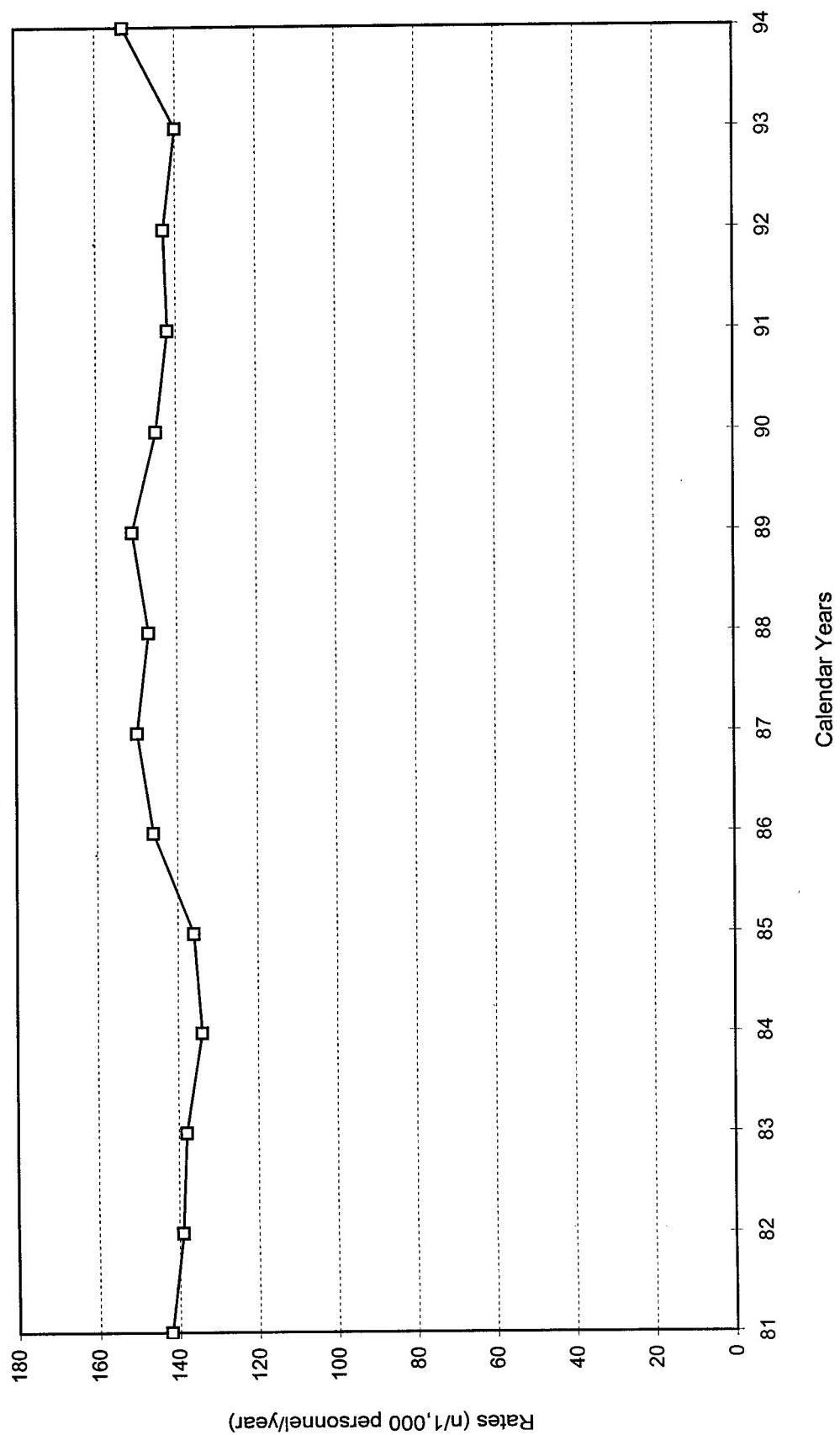
Figure 5-5 illustrates the rates of hospitalization by year for active duty Army personnel for CY 1981-1994. Hospitalization rates increased 8% from 142 per 1,000 personnel in CY 1981 to 153 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-5

Army - Rates of Hospitalization by Calendar Year*									
1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
142	139	138	134	136	146	150	147	151	145

* Rates per 1,000 personnel.

Army - Rates of Hospitalization by Year, CY 1981-1994



Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity,
Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-5

Figure 5-6 illustrates the rates of hospitalization for the top 10 principal diagnosis groups for active duty Army personnel for CY 1981-1994.

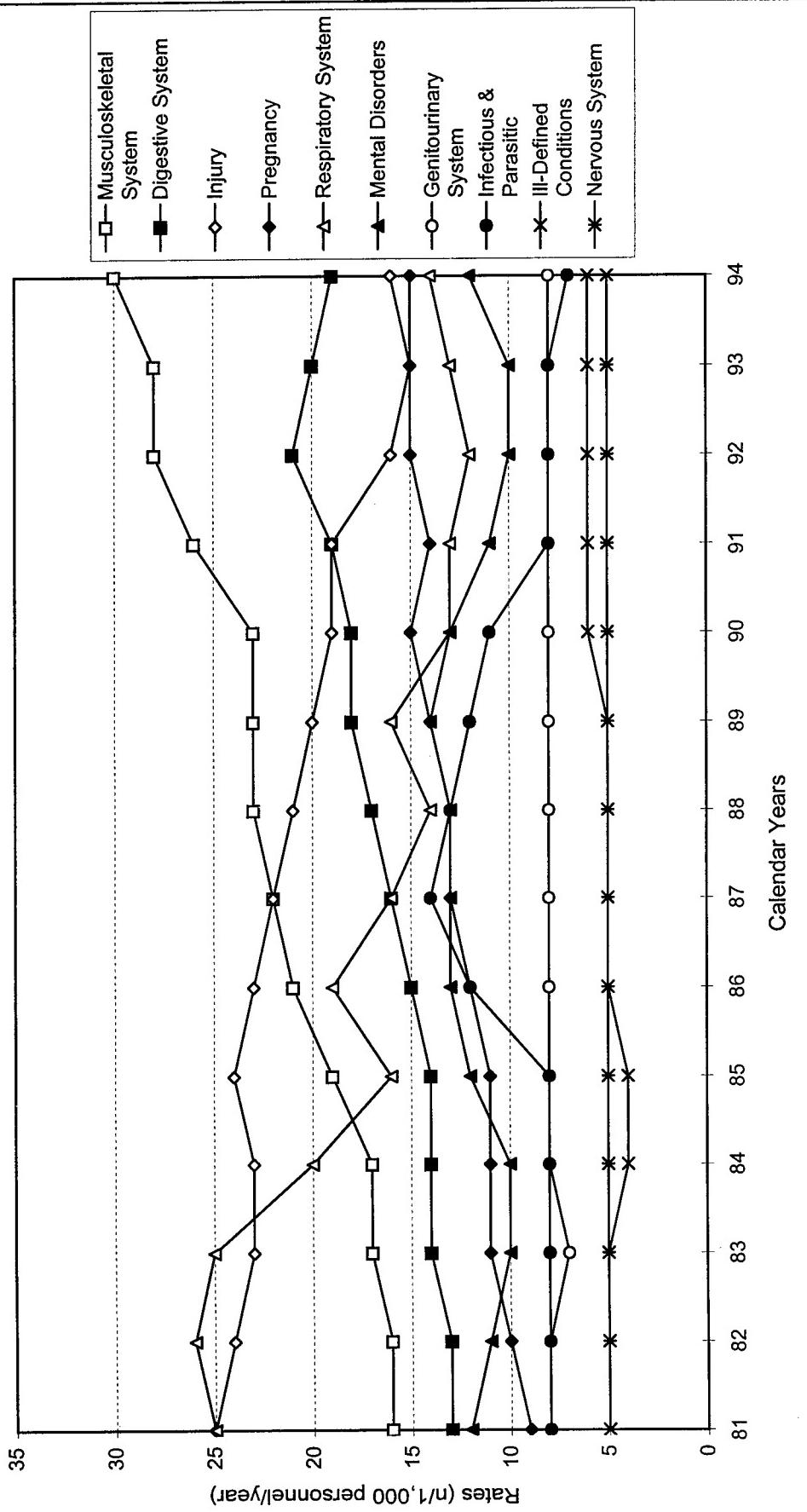
- Musculoskeletal system hospitalization rates increased 88% from 16 per 1,000 personnel in CY 1981 to 30 per 1,000 personnel in CY 1994.
- Digestive system hospitalization rates increased 46% from 13 per 1,000 personnel in CY 1981 to 19 per 1,000 personnel in CY 1994.
- Injury hospitalization rates decreased 36% from 25 per 1,000 personnel in CY 1981 to 16 per 1,000 personnel in CY 1994.
- Pregnancy hospitalization rates increased 67% from 9 per 1,000 personnel in CY 1981 to 15 per 1,000 personnel in CY 1994.
- Respiratory system hospitalization rates decreased 44% from 25 per 1,000 personnel in CY 1981 to 14 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-6

Principal Diagnosis Groups (Rank Based on 1994 Data)	ICD-9 Codes	Army - Rates of Hospitalization by Calendar Year*												
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Musculoskeletal System	710-739	16	16	17	17	19	21	22	23	23	26	28	28	30
Digestive System	520-579	13	13	14	14	15	16	17	18	18	19	21	20	19
Injury	800-999	25	24	23	24	23	22	21	20	19	19	16	15	16
Pregnancy	630-676	9	10	11	11	12	13	13	14	15	14	15	15	15
Respiratory System	460-519	25	26	25	20	16	19	16	14	16	13	13	12	13
Mental Disorders	290-319	12	11	10	10	12	13	13	14	13	11	10.	10	12
Genitourinary System	580-629	8	8	7	8	8	8	8	8	8	8	8	8	8
Infectious & Parasitic	001-139	8	8	8	8	8	12	14	13	12	11	8	8	7
Ill-Defined Conditions	780-799	5	5	5	4	4	5	5	5	5	6	6	6	6
Nervous System	320-389	5	5	5	5	5	5	5	5	5	5	5	5	5

* Rates per 1,000 personnel.

Army - Rates of Hospitalization for the Top 10 Principal Diagnosis Groups,* CY 1981-1994



* Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-6

Figure 5-7 illustrates the rates of hospitalization for the top 10 principal diagnosis groups for active duty Army men for CY 1981-1994.

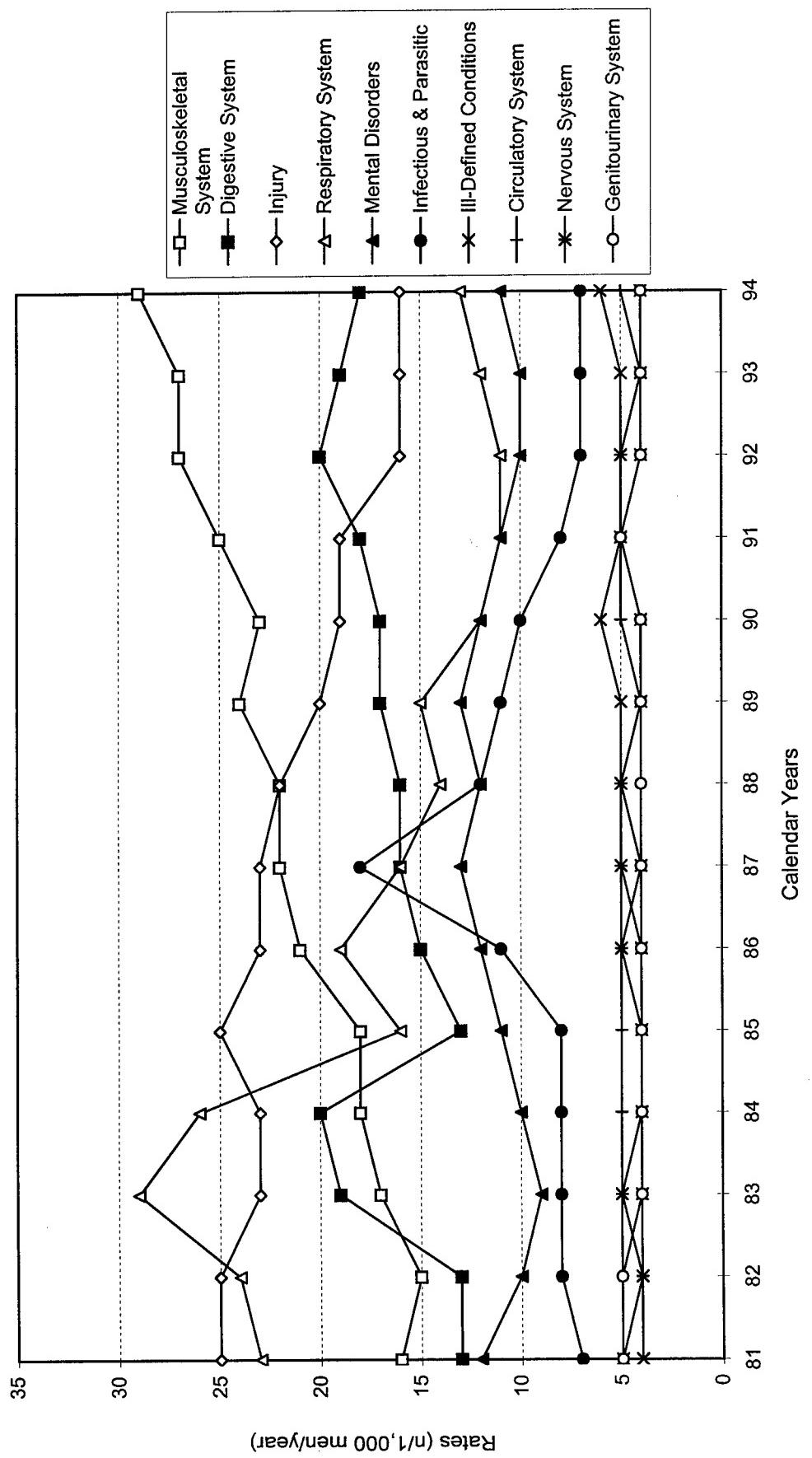
- Every year from CY 1981 to 1994, both the musculoskeletal system and injury principal diagnosis groups were among the top three hospitalization rates for men.
- Musculoskeletal system hospitalization rates for men increased 81% from 16 per 1,000 personnel in CY 1981 to 29 per 1,000 personnel in CY 1994.
- Digestive system hospitalization rates for men increased 38% from 13 per 1,000 personnel in CY 1981 to 18 per 1,000 personnel in CY 1994.
- Injury hospitalization rates decreased 36% from 25 per 1,000 personnel in CY 1981 to 16 per 1,000 personnel in CY 1994.
- Respiratory system hospitalization rates for men decreased 44% from 23 per 1,000 personnel in CY 1981 to 13 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-7

Principal Diagnosis Groups (Rank Based on 1994 Data)	ICD-9 Codes	Army - Rates of Hospitalization by Calendar Year*													
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Musculoskeletal System	710-739	16	15	17	18	18	21	22	22	24	23	25	27	27	29
Digestive System	520-579	13	13	19	20	13	15	16	16	17	17	18	19	19	18
Injury	800-999	25	25	23	23	25	23	23	22	20	19	19	16	16	16
Respiratory System	460-519	23	24	29	26	16	19	16	14	15	12	11	11	12	13
Mental Disorders	290-319	12	10	9	10	11	12	13	12	13	12	11	10	10	11
Infectious & Parasitic	001-139	7	8	8	8	11	18	12	11	10	8	7	7	7	7
III-Defined Conditions	780-799	4	4	5	4	4	4	5	5	6	5	5	5	5	6
Circulatory System	390-459	5	5	5	5	5	5	5	4	5	5	5	5	4	5
Nervous System	320-389	5	4	4	4	5	4	5	4	4	5	4	4	4	4
Genitourinary System	580-629	5	5	4	4	4	4	4	4	4	5	4	4	4	4

* Rates per 1,000 personnel.

Army - Rates of Hospitalization for the Top 10 Principal Diagnosis Groups* for Men, CY 1981-1994



* Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-7

Figure 5-8 illustrates the rates of hospitalization for the top 10 principal diagnosis groups for active duty Army women for CY 1981-1994.

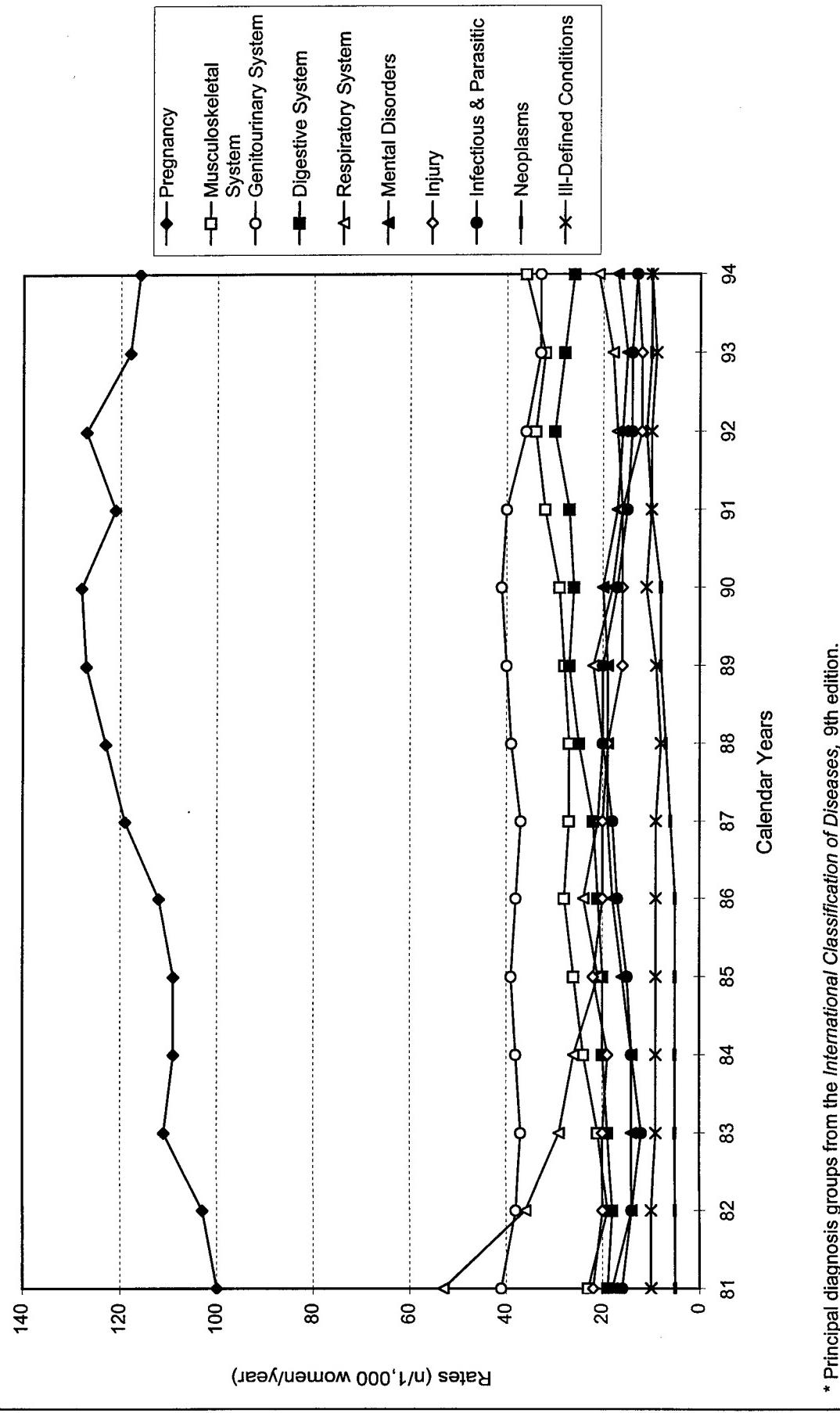
- Every year from CY 1981 to 1994, musculoskeletal system diseases were among the top four hospitalization rates for women.
- Each year, the hospitalization rate for pregnancy ranked the highest. For the entire period, there appears to be a slight increase in rates.
- Musculoskeletal system hospitalization rates for women increased 57% from 23 per 1,000 personnel in CY 1981 to 36 per 1,000 personnel in CY 1994.
- Respiratory system hospitalization rates for women decreased 60% from 53 per 1,000 personnel in CY 1981 to 21 per 1,000 personnel in CY 1994.
- Injury hospitalization rates for women decreased 41% from 22 per 1,000 personnel in CY 1981 to 13 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-8

Principal Diagnosis Groups (Rank Based on 1994 Data)	ICD-9 Codes	Army - Rates of Hospitalization by Calendar Year*													
		1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Pregnancy	630-676	100	103	111	109	109	112	119	123	127	128	121	127	118	116
Musculoskeletal System	710-739	23	19	21	24	26	28	27	27	28	29	32	34	32	36
Genitourinary System	580-629	41	38	37	38	39	38	37	39	40	41	40	36	33	33
Digestive System	520-579	19	18	19	20	20	21	22	25	27	26	27	30	28	26
Respiratory System	460-519	53	36	29	26	21	24	21	20	22	18	16	17	18	21
Mental Disorders	290-319	18	14	14	14	16	18	19	19	19	20	17	16	15	17
Injury	800-999	22	20	20	19	22	20	20	19	16	16	16	12	12	13
Infectious & Parasitic	001-139	16	14	12	14	15	17	18	20	20	17	15	14	14	13
Neoplasms	140-239	5	5	5	5	5	5	6	7	8	8	10	11	10	10
Ill-Defined Conditions	780-799	10	10	9	9	9	9	8	9	11	10	10	9	10	

* Rates per 1,000 personnel.

Army - Rates of Hospitalization for the Top 10 Principal Diagnosis Groups* for Women, CY 1981-1994



* Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-9 illustrates the rates of hospitalization for musculoskeletal system diseases and injuries for active duty Army men and women by principal diagnosis group for CY 1981-1994.

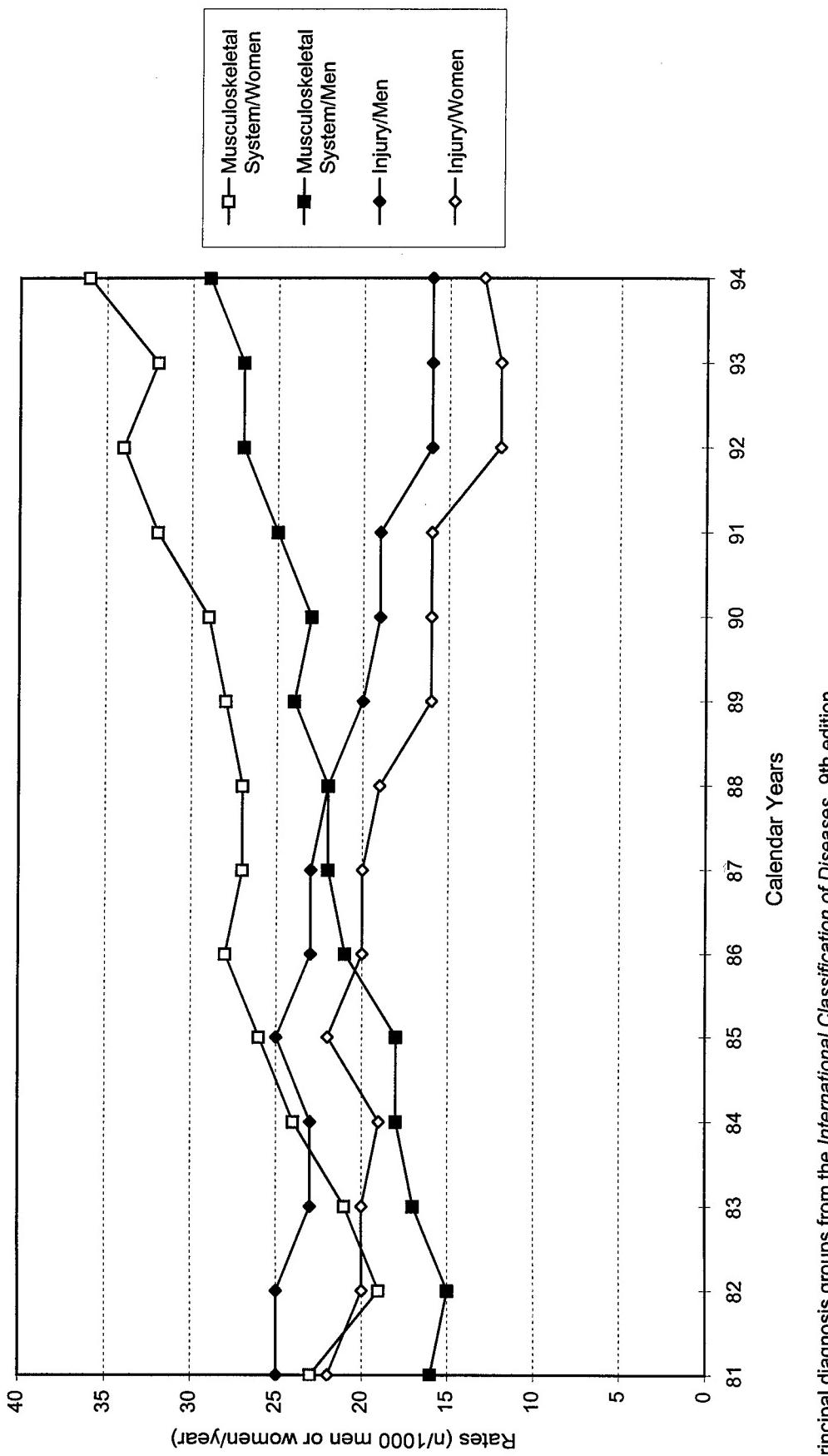
- Musculoskeletal system condition rates for women increased 57% from 23 per 1,000 personnel in CY 1981 to 36 per 1,000 personnel in CY 1994.
- Musculoskeletal system condition rates for men increased 81% from 16 per 1,000 personnel in CY 1981 to 29 per 1,000 personnel in CY 1994.
- Injury rates for men decreased 36% from 25 per 1,000 personnel in CY 1981 to 16 per 1,000 personnel in CY 1994.
- Injury rates for women decreased 41% from 22 per 1,000 personnel in CY 1981 to 13 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-9

Principal Diagnosis Groups (Rank Based on 1994 Data)	Army - Rates of Hospitalization by Calendar Year*													
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Musculoskeletal System/Women	23	19	21	24	26	28	27	27	28	29	32	34	32	36
Musculoskeletal System/Men	16	15	17	18	18	21	22	22	24	23	25	27	27	29
Injury/Men	25	25	23	23	25	23	23	22	20	19	19	16	16	16
Injury/Women	22	20	20	19	22	20	20	19	16	16	16	12	12	13

* Rates per 1,000 personnel.

Army - Rates of Hospitalization for the Musculoskeletal System and Injury Principal Diagnosis Groups* for Men and Women, CY 1981-1994



*Principal diagnosis groups from the *International Classification of Diseases*, 9th edition.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity,
Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-9

Table 5-5 displays the frequency, case rate, and NER data by principal diagnosis group for hospitalized active duty Army men and women for CY 1994.

- The top three hospitalization rates for men were:
 - Musculoskeletal system—28.89.
 - Digestive system—17.84.
 - Injury—16.19.
- The top three hospitalization rates for women were:
 - Pregnancy—115.77.
 - Musculoskeletal system—35.86.
 - Genitourinary system—33.47.
- The top three NERs for men were:
 - Musculoskeletal system—326.00.
 - Mental disorders—278.20.
 - Injury—192.27.
- The top three NERs for women were:
 - Pregnancy—965.20.
 - Musculoskeletal system—363.33.
 - Mental disorders—286.11.
- Excluding pregnancy, musculoskeletal system diseases were the leading cause of hospitalizations and non-effective days for both men and women.
- Case rates and NERs for injuries ranked third for men and eighth for women.

Table 5-5. Army - Frequency (n), Case Rates, and Non-Effective Rates by Principal Diagnosis Group for Hospitalized Active Duty Men and Women, CY 1994

Principal Diagnosis Groups	ICD-9 Codes	Men				Women				Total
		n	Case Rate*	NER†	n	Case Rate	NER	n	Case Rate	
Musculoskeletal System	710-739	13,853	28.89	326.00	2,529	35.86	363.33	16,382	29.78	330.79
Digestive System	520-579	8,558	17.84	92.28	1,815	26.74	138.41	10,373	18.86	98.19
Injury	800-999	7,762	16.19	192.27	915	12.98	115.88	8,677	16.77	182.47
Pregnancy	630-676	0	0	0	8,164	115.77	965.20	8,165	14.84	122.45
Respiratory System	460-519	6,194	12.92	58.37	1,453	20.60	87.69	7,647	13.90	62.13
Mental Disorders	290-319	5,425	11.31	278.20	1,229	17.43	286.11	6,654	12.10	279.21
Genitourinary System	580-629	1,929	4.02	22.30	2,360	33.47	168.62	4,289	7.80	41.05
Infectious & Parasitic	001-139	3,171	6.61	39.13	898	12.73	62.88	4,069	7.40	42.17
V Codes‡	V01-V82	2,384	4.97	40.99	1,167	16.55	81.59	3,551	6.46	46.19
III-Defined Conditions	780-799	2,786	5.81	43.19	680	9.64	80.71	3,466	6.30	48.00
Nervous System	320-389	2,080	4.34	80.92	567	8.04	81.69	2,647	4.81	81.02
Circulatory System	390-459	2,334	4.87	60.88	303	4.30	36.53	2,637	4.79	57.76
Neoplasms	140-239	1,332	2.78	55.32	719	10.20	128.33	2,051	3.73	64.68
Skin & Breast	680-709	1,624	3.39	23.74	302	4.28	26.27	1,926	3.50	23.94
Congenital Anomalies	740-759	559	1.17	12.68	108	1.53	20.60	667	1.21	13.69
Endocrine, Nutritional, Metabolic	240-279	460	0.96	16.85	184	2.61	17.07	644	1.71	16.88
Blood & Blood-Forming Organs	280-289	167	0.35	4.14	74	1.05	10.04	241	0.44	4.90
Totals	—	60,618	126.42	1,347.26	23,467	333.78	2,670.95	84,086	154.40	1,515.52

* Case rate = number of persons hospitalized per 1,000 personnel per year.

† NER = number of persons on the hospital rolls per 1,000 personnel per year.

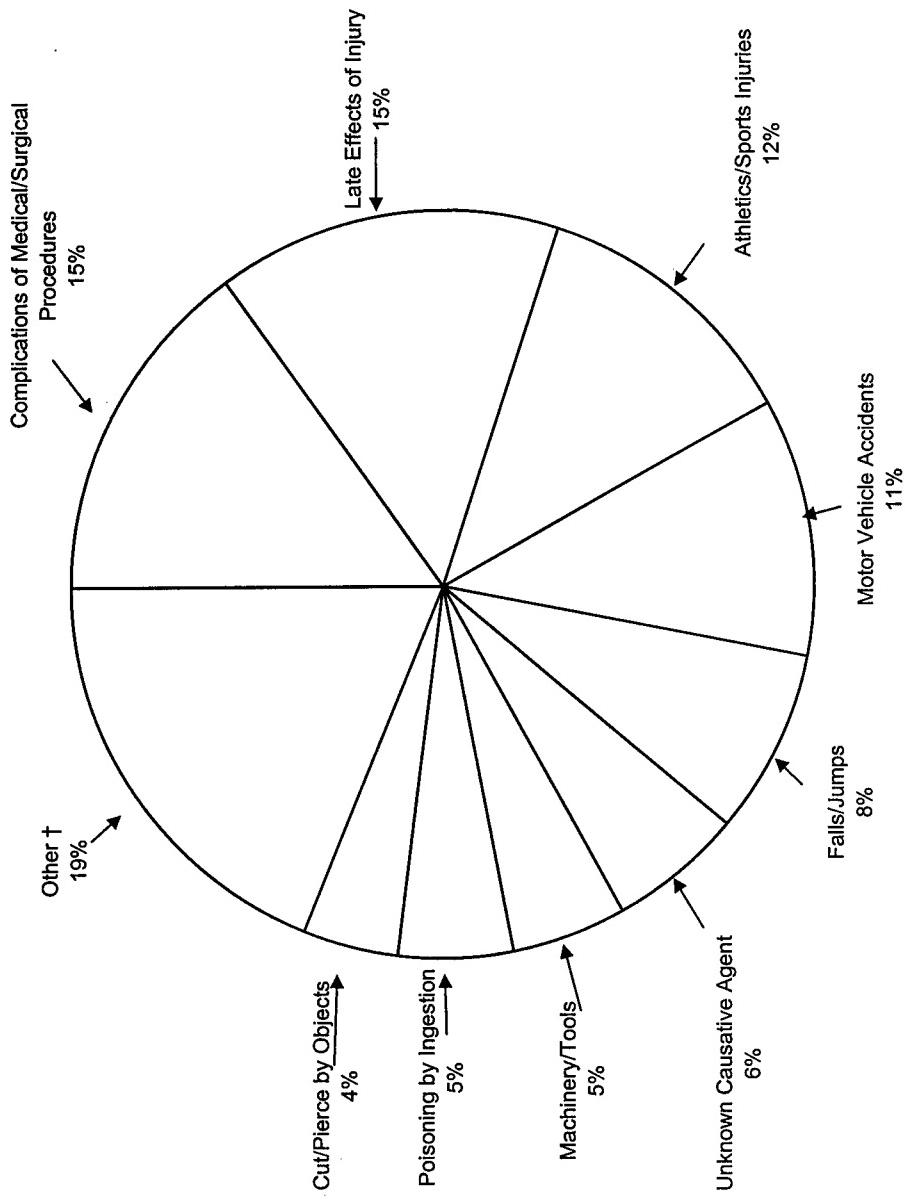
‡ Circumstances recorded as diagnoses or problems, but not classified as a disease, injury, or E code.
Source: Army Medical Surveillance Activity, USACHPPM, 1996.

Hospitalizations by External Causes of Injury.

Figure 5-10 illustrates the distribution of hospitalizations by external cause of injury for active duty Army personnel for CY 1994. Of a total of 13,002 hospitalizations, the top five causes were:

- Complications of medical or surgical procedures—15%.
- Late effects of injury—15%.
- Athletics and sports injuries—12%.
- Motor vehicle accidents—11%.
- Falls and jumps—8%.

Army - Distribution (%) of Hospitalizations by External Cause of Injury,* CY 1994



n = 13,002.

* NATO Standard Agreement (STANAG) codes.

† Other includes diagnosis groups accounting for less than 4%.

Source: Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-10

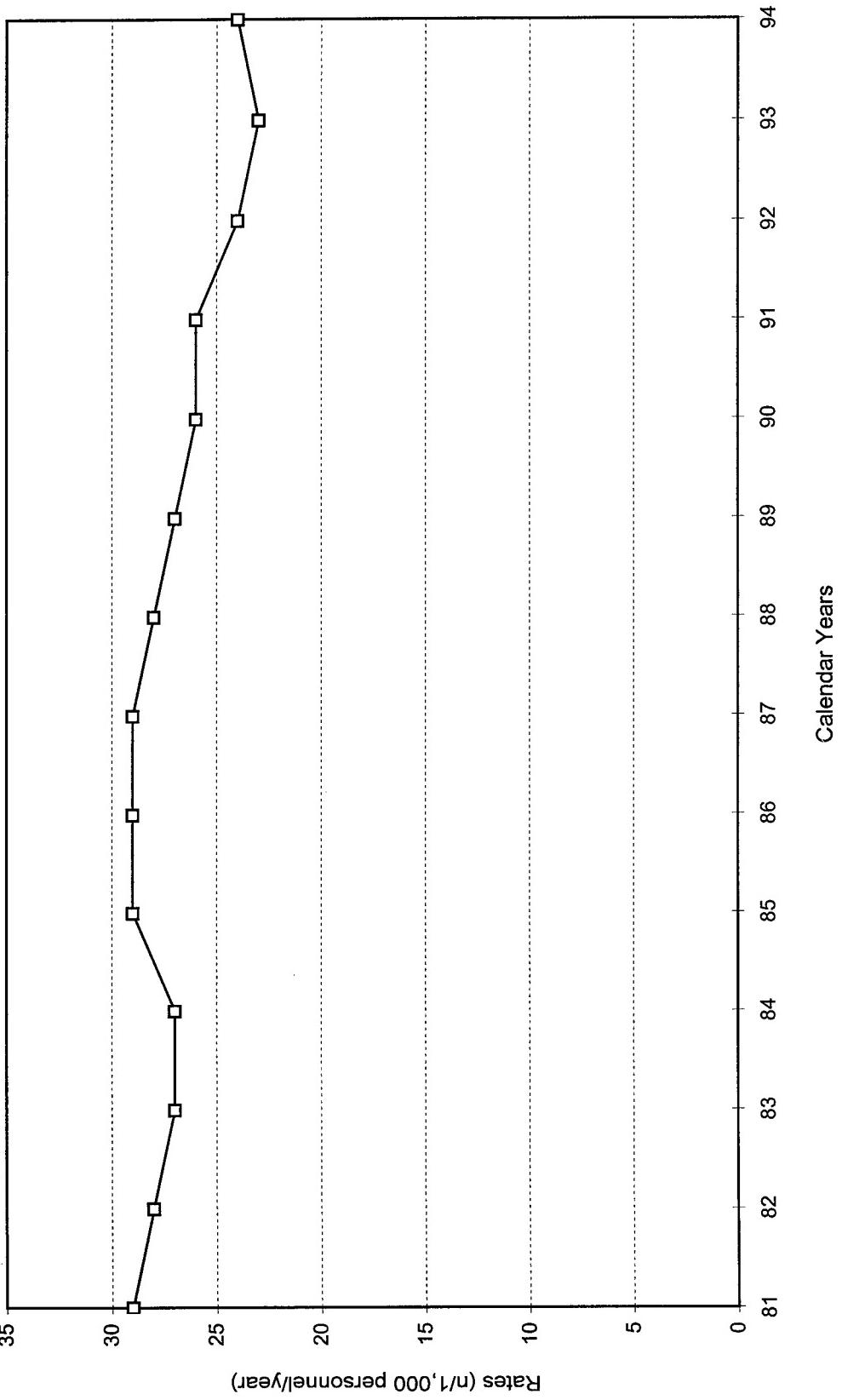
Figure 5-11 illustrates the rates of hospitalization coded by external cause of injury for active duty Army personnel for CY 1981-1994. The overall rate decreased 17% from 29 per 1,000 personnel in CY 1981 to 24 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-11

Army - Rates of Hospitalizations by External Cause of Injury by Calendar Year*									
1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
29	28	27	27	29	29	29	28	27	26
									24

* Rates per 1,000 personnel.

Army - Rates of Hospitalization Coded by External Cause of Injury,* CY 1981-1994



* NATO Standard Agreement (STANAG) codes.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity,
Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-11

Figure 5-12 illustrates the rates of hospitalization for the top 10 external causes of injury for active duty Army personnel for CY 1981-1994.

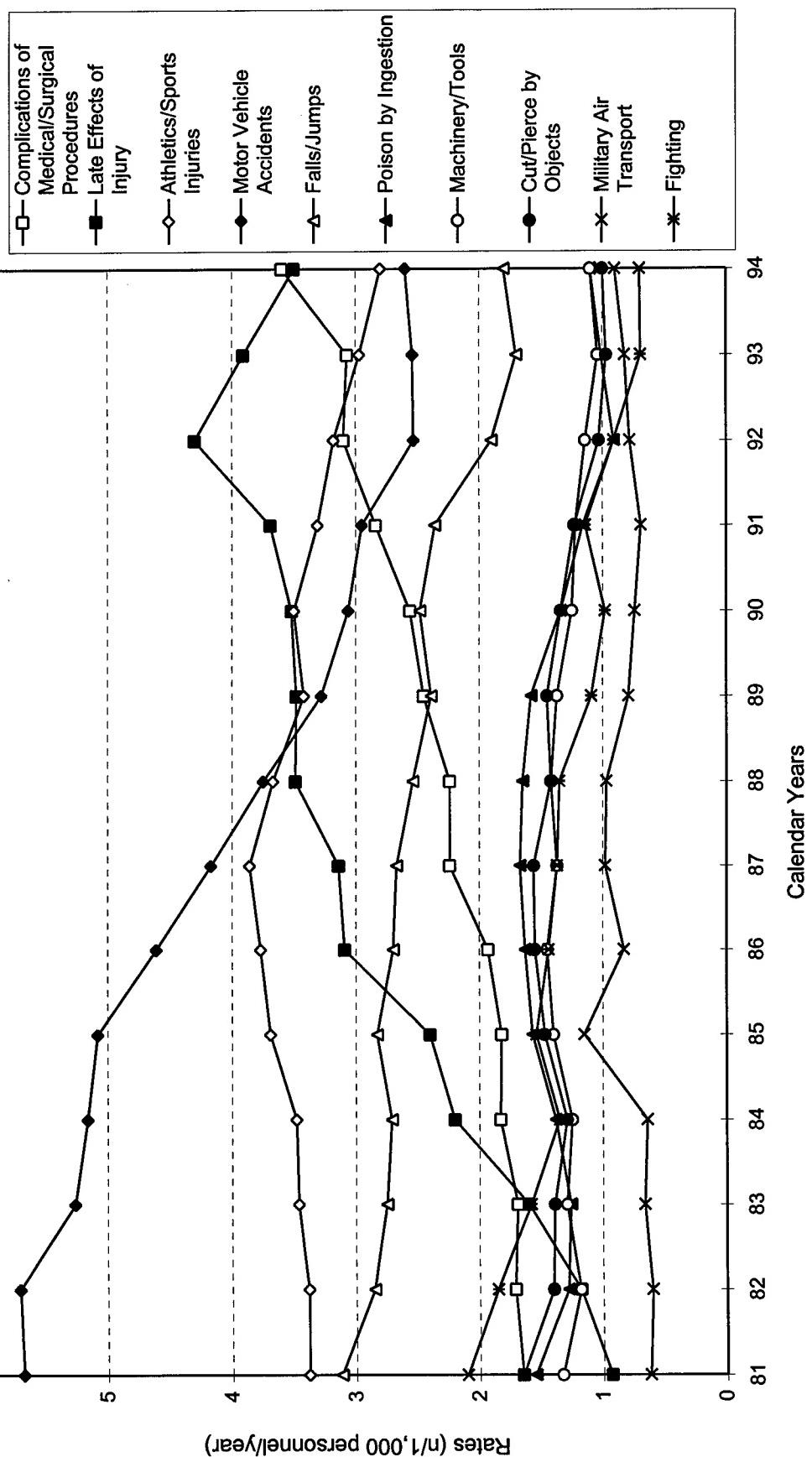
- Complications of medical or surgical procedures rates increased 118% from 1.65 per 1,000 personnel in CY 1981 to 3.60 per 1,000 personnel in CY 1994.
- Late effects of injury rates increased 276% from 0.93 per 1,000 personnel in CY 1981 to 3.50 per 1,000 personnel in CY 1994.
- Athletics and sports injuries rates decreased 17% from 3.38 per 1,000 personnel in CY 1981 to 2.80 per 1,000 personnel in CY 1994.
- Motor vehicle accident rates decreased 54% from 5.67 per 1,000 personnel in CY 1981 to 2.60 per 1,000 personnel in CY 1994.
- Falls and jumps rates decreased 42% from 3.12 per 1,000 personnel in CY 1981 to 1.80 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-12

Top 10 External Causes (Rank Based on 1994 Data)	Army - Rates of Injury Hospitalization by Calendar Year*													
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Complications of Medical/Surgical Procedures	1.65	1.71	1.69	1.83	1.82	1.93	2.24	2.24	2.45	2.56	2.84	3.10	3.07	3.60
Late Effects of Injury	0.93	1.18	1.60	2.20	2.40	3.09	3.14	3.49	3.48	3.52	3.69	4.30	3.91	3.50
Athletics/Sports Injuries	3.38	3.38	3.46	3.48	3.69	3.77	3.86	3.67	3.42	3.50	3.31	3.18	2.97	2.80
Motor Vehicle Accidents	5.67	5.70	5.26	5.16	5.08	4.61	4.17	3.75	3.28	3.06	2.95	2.53	2.54	2.60
Falls/Jumps	3.12	2.85	2.75	2.71	2.83	2.70	2.67	2.54	2.39	2.48	2.36	1.90	1.70	1.80
Poisoning by Ingestion	1.55	1.28	1.26	1.38	1.57	1.63	1.67	1.65	1.58	1.34	1.16	0.91	1.01	1.10
Machinery/Tools	1.33	1.18	1.29	1.25	1.40	1.45	1.37	1.42	1.37	1.25	1.22	1.14	1.04	1.10
Cut/Pierce by Objects	1.65	1.40	1.39	1.29	1.47	1.55	1.56	1.42	1.45	1.34	1.23	1.03	0.97	1.00
Military Air Transport Accidents	0.62	0.60	0.66	0.64	1.15	0.83	0.98	0.97	0.79	0.74	0.69	0.78	0.82	0.90
Fighting	2.10	1.85	1.58	1.35	1.54	1.44	1.37	1.35	1.09	0.98	1.14	0.91	0.69	0.70

* Rates per 1,000 personnel.

Army - Rates of Hospitalization for the Top 10 External Causes of Injury,* CY 1981-1994



* NATO Standard Agreement (STANAG) codes.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-12

Figure 5-13 illustrates the NERs for hospitalizations for the top 10 external causes of injury for active duty Army personnel for CY 1981-1994.

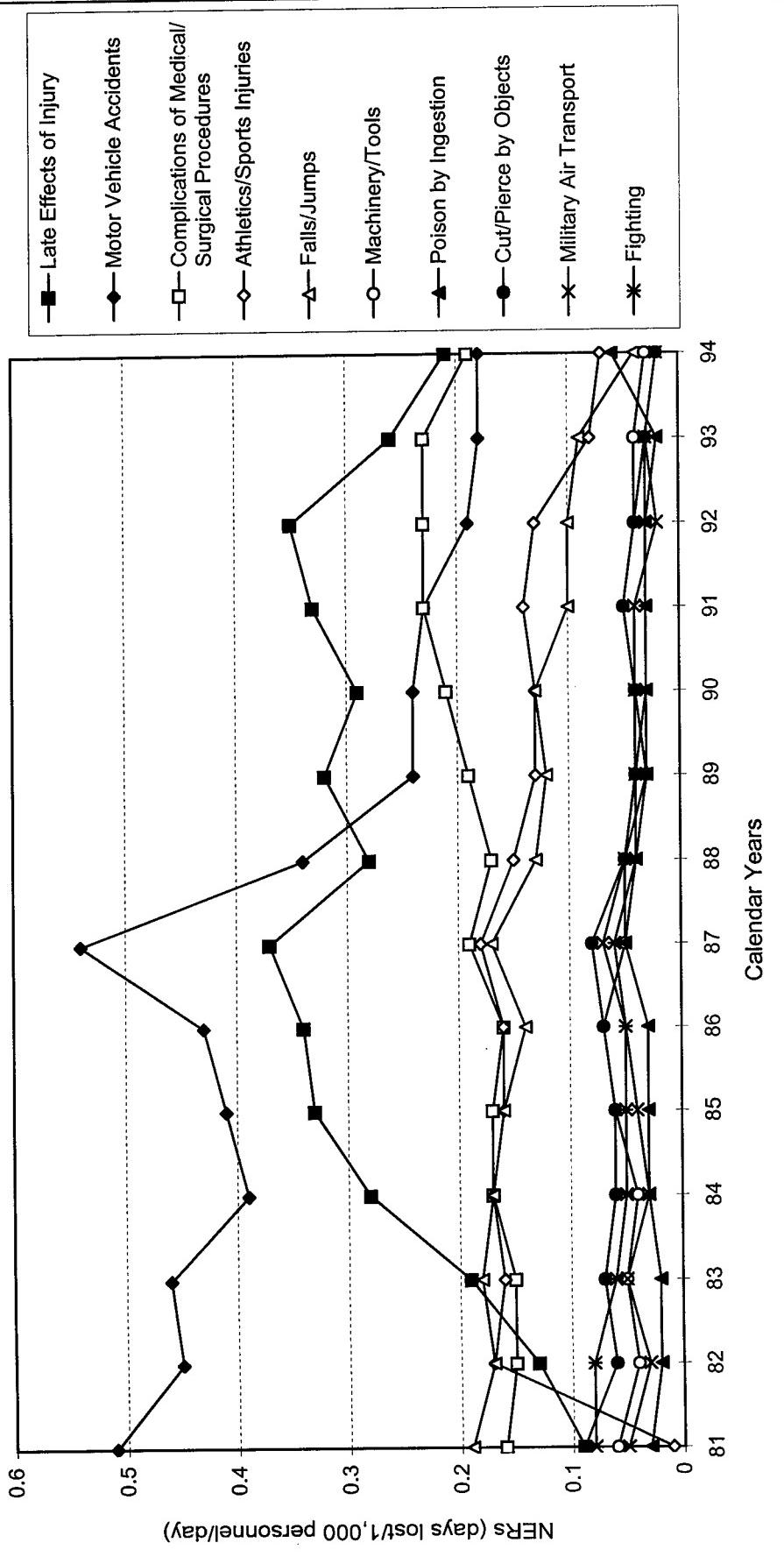
- Late effects of injury NERs increased 133% from 0.09 per 1,000 personnel in CY 1981 to 0.21 per 1,000 personnel in CY 1994.
- Motor vehicle accident NERs decreased 64% from 0.51 per 1,000 personnel in CY 1981 to 0.18 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-13

Top 10 External Causes (Rank Based on 1994 Data)	Army - NERs for Hospitalizations Due to Injuries by Calendar Year*													
	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Late Effects of Injury	0.09	0.13	0.19	0.28	0.33	0.34	0.37	0.28	0.32	0.29	0.33	0.35	0.26	0.21
Complications of Medical/Surgical Procedures	0.16	0.15	0.15	0.17	0.17	0.16	0.19	0.17	0.19	0.21	0.23	0.23	0.23	0.19
Motor Vehicle Accidents	0.51	0.45	0.46	0.39	0.41	0.43	0.54	0.34	0.24	0.24	0.23	0.19	0.18	0.18
Athletics/Sports Injuries	0.01	0.17	0.16	0.17	0.16	0.16	0.18	0.15	0.13	0.13	0.14	0.13	0.08	0.07
Falls/Jumps	0.19	0.17	0.18	0.17	0.16	0.14	0.17	0.13	0.12	0.13	0.10	0.10	0.09	0.06
Machinery/Tools	0.06	0.04	0.05	0.04	0.06	0.07	0.05	0.05	0.03	0.04	0.05	0.04	0.04	0.03
Poisoning by Ingestion	0.03	0.02	0.02	0.03	0.03	0.03	0.05	0.04	0.03	0.03	0.03	0.03	0.02	0.03
Cut/Pierce by Object	0.09	0.06	0.07	0.06	0.06	0.07	0.08	0.05	0.04	0.04	0.05	0.04	0.03	0.02
Military Air Transport Accidents	0.05	0.03	0.05	0.03	0.04	0.05	0.07	0.05	0.03	0.04	0.04	0.02	0.03	0.02
Fighting	0.08	0.08	0.06	0.05	0.05	0.05	0.06	0.04	0.04	0.03	0.03	0.03	0.03	0.02

* Rates are days lost per 1,000 personnel per day.

Army - Non-Effective Rates for Hospitalization for the Top 10 External Causes of Injury,* CY 1981-1994



*NATO Standard Agreement (STANAG) codes.

Source: Individual Patient Data Systems, Patient Administration Systems and Biostatistics Activity, Fort Sam Houston, TX, and the Army Medical Surveillance Activity, USACHPPM, 1994.

Figure 5-13

Table 5-6 displays the frequency, case rate, and NER data by external cause of injury for hospitalized active duty Army men and women for CY 1994.

- The top three hospitalization rates for men were:
 - Late effects of injury—3.64.
 - Athletics and sports injuries—3.11.
 - Complications of medical or surgical procedures—2.99.
- The top three hospitalization rates for women were:
 - Complications of medical or surgical procedures—7.33.
 - Motor vehicle accidents—2.62.
 - Late effects of injury—2.35.
- The top three NERs for men were:
 - Late effects of injury—82.07.
 - Motor vehicle accidents—69.03.
 - Complications of medical or surgical procedures—63.48.
- The top three NERs for women were:
 - Complications of medical or surgical procedures—98.94.
 - Late effects of injury—45.73.
 - Motor vehicle accidents—40.44.
- Late effects of injury and complications of medical or surgical procedures were among the top three hospitalization case rates and NERs for both men and women.
 - Men and women had similar case rates of motor vehicle accidents.
 - Men had nearly three times the rate of sports injuries as compared to women.

Table 5-6. Army - Frequency (n), Case Rates, and Non-Effective Rates by External Cause of Injury for Hospitalized Active Duty Men and Women, CY 1994

External Causes of Injury	Men			Women			Total		
	n	Case Rate*	NER†	n	Case Rate	NER	n	Case Rate	NER
Late Effects of Injury	1,745	3.64	82.07	166	2.35	45.73	1,911	3.47	77.42
Athletics/Sports Injuries	1,490	3.11	28.55	77	1.09	5.06	1,567	2.85	25.54
Complications of Medical/Surgical Procedures	1,436	2.99	63.48	517	7.33	98.94	1,953	3.55	68.02
Motor Vehicle Accidents	1,235	2.58	69.03	185	2.62	40.44	1,420	2.58	65.37
Falls/Jumps	837	1.75	20.90	161	2.28	18.90	998	1.81	20.64
Unknown or Unspecified Agents	729	1.52	14.04	110	1.56	12.42	839	1.53	13.83
Machinery/Tools	580	1.21	9.62	45	0.64	6.20	625	1.14	9.19
Cut/Pierce by Objects	504	1.05	7.71	62	0.88	11.97	566	1.03	8.25
Military Air Transport Accidents	477	1.00	7.95	15	0.21	1.25	492	0.89	7.09
Poisoning by Ingestion	437	0.91	8.48	165	2.34	17.90	602	1.09	9.69
Fighting	366	0.76	7.37	29	0.41	9.15	395	0.72	7.59
Poisoning by Inhalation, Fire, or Corrosive Agents	338	0.71	8.80	50	0.71	5.50	388	0.71	8.38
Guns, Explosives, and Related Agents	248	0.52	12.50	11	0.16	3.40	259	0.47	11.33
Twisting/Turning/Slipping	241	0.50	6.57	32	0.45	13.22	273	0.50	7.43
Excessive Heat	173	0.36	0.91	23	0.33	0.94	196	0.36	0.91

Table 5-6.—Continued

External Causes of Injury	Men			Women			Total		
	n	Case Rate*	NER†	n	Case Rate	NER	n	Case Rate	NER
Other Specified Environmental Factors	126	0.26	0.89	12	0.17	0.45	138	0.25	0.84
Water and Other Land Transport	100	0.21	3.65	9	0.13	1.59	109	0.20	3.38
Lifting/Pushing/Pulling	69	0.14	1.08	11	0.17	0.71	80	0.15	1.03
Marching/Drilling	49	0.10	1.10	11	0.16	2.51	60	0.11	1.28
Complications of Prophylactic Inoculations	33	0.07	0.13	11	0.16	0.30	44	0.08	0.15
Excessive Cold	27	0.06	0.52	14	0.20	0.64	41	0.08	0.53
Nonmilitary Air Transport Accidents	12	0.03	0.08	1	0.01	0.10	13	0.02	0.08
Hanging/Suffocation	11	0.02	0.19	1	0.01	0.06	12	0.02	0.18
Conventional Weapons Injury	9	0.02	2.20	0	0	0	9	0.02	1.92
Drowning or Submersion	7	0.02	0.01	0	0	0	7	0.01	0.01
Accidents with Own Instruments of War	3	0.01	0.54	0	0	0	3	0.01	0.47
Escape System Injuries	2	0	0.10	0	0	0	2	0	0.09
Totals	11,284	23.55	358.47	1,718	24.37	297.38	13,002	23.65	350.64

* Case Rate = number of persons hospitalized per 1,000 personnel per year.

† NER = number of persons on the hospital rolls per 1,000 personnel per year.

Source: Army Medical Surveillance Activity, USACHPPM, 1996.

5-7. Navy

The Navy has two sources of hospitalization data:

- For reporting purposes, the NMIMC, whose data is cited in this section, groups hospitalization data using major diagnostic categories (MDC) instead of the standard ICD-9 principal diagnostic groups (PDG) used elsewhere in this chapter. The MDC system groups diagnoses based on diagnosis related groups (DRG) and is comprised of 25 categories (see Appendix A, Table A-4).
- In contrast, NHRC, which supplied data that overlaps several years of the NMIMC data, reported hospitalization data using the same ICD-9 PDGs presented elsewhere by the Army and Air Force. The ICD system is comprised of 18 major subgroups. NHRC data is provided in Supplement B for comparison purposes.

The Navy hospitalization data are presented in three parts:

- The Navy Summary. The Navy hospitalization data presented in this section are summarized in three tables.
 - The overall summary is presented in Table 5-7.
 - The data in figures 5-15 and 5-16 are summarized in Table 5-8.
 - The data in figures 5-18, 5-19, and 5-20 are summarized in Table 5-9.
- Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.
- The distribution of hospitalizations by major diagnostic categories for FY 1994 is displayed in Figure 5-14.
- The distribution of the top 15 musculoskeletal system diagnoses for hospitalized men and women for FY 1994 are displayed in figures 5-15 and 5-16, respectively.
- Trends of Navy Injury-Related Hospitalizations Over Time.
 - The rates of hospitalization by year for FY 1989-1994 are displayed in Figure 5-17.
 - The rates of the top 10 causes of hospitalization for all personnel, men, and women for FY 1989-1994 are displayed in figures 5-18, 5-19, and 5-20, respectively.
 - The rates of hospitalization for musculoskeletal system diagnoses for men and women for FY 1989-1994 are displayed in Figure 5-21.
 - The frequency and case rates by major diagnostic categories for hospitalized men and women for FY 1994 are presented in Table 5-10.

The Navy Summary.

Table 5-7. Overall Summary of Hospitalization Data for Active Duty Navy Personnel

Year	Navy Population	Hospitalizations		Rates and Trends of Hospitalizations		Conclusion
		Total	n/1,000 Personnel/Year	n/1,000 Personnel/Year	Trend, % Change (FY 1989-1994)	
FY89-94	—	—	—	93 (FY89) —	71 (FY94) —	Down 24% —
FY94	468,662	32,021	71	—	—	Navy hospitalization rates have declined over this 6-year period.

Table 5-8. Summary of Hospitalizations by the Top 15 Musculoskeletal System Diagnoses for Active Duty Navy Men and Women, FY 1994

Top 15 Musculoskeletal System Diagnoses	Distribution (%) of Total Hospitalizations				Conclusion
	Men (n = 6,241)	Women (n = 886)	%	Rank	
Internal Derangement of the Knee	10.8%	1	5.3%	4	Most of the musculoskeletal system diagnoses for both men and women appear to be injury related.
Old Injuries, Anterior Cruciate Ligament	9.3%	2	6.2%	3	
Lumbar Disc Displacements	4.9%	3	2.1%	10	
Removal of Fracture Plates	4.8%	4	4.9%	.5	
Shoulder Joint Derangements	2.8%	5	—	—	
Patella Chondromalacia	2.6%	6	2.4%	7	
Fracture Nonunion	2.3%	7	—	—	
Other Shoulder Conditions	2.1%	8	—	—	
Meniscus/Medial Cart Knee Tears	2.1%	9	—	—	
Recurring Shoulder Dislocations	1.8%	10	—	—	
Joint Ganglion	1.7%	11	3.5%	6	
Cruciate Ligament Sprains Knee	1.7%	12	1.7%	15	
Cervical Disc Displacements	1.5%	13	—	—	
Hallux Valgus	1.4%	14	9.0%	1	
Bunions	1.3%	15	7.8%	2	
Disorder of Synovium/Tendon/Bursa	—	—	2.3%	8	
Hammer Toe Other	—	—	2.3%	9	
Lower Leg Joint Pain	—	—	2.0%	11	
Ganglion, Unspecified	—	—	2.0%	12	
Ankle/Foot Joint Derangements Other	—	—	1.8%	13	
Tendon Sheath Ganglion	—	—	1.7%	14	

Table 5-9. Rates of Top 10 Causes of Hospitalization by Major Diagnostic Category for Active Duty Navy Personnel, FY 1989-1994

Top 10 Causes of Hospitalization	Rates Per 1,000 Personnel/Year										Conclusions
	Total			Men			Women				
	FY 1989	FY 1994	% Change (FY 89-94)	FY 1989	FY 1994	% Change (FY 89-94)	FY 1989	FY 1994	% Change (FY 89-94)		
MDC 8: Musculoskeletal System	22	16	Down 24%	22	16	Down 27%	21	17	Down 19%	<ul style="list-style-type: none"> Every major diagnostic category in the top 10 decreased (25 to 50%) except pregnancy, which increased 29% and ear/nose/throat and circulatory system, which registered no change. Musculoskeletal system diseases decreased 24%. 	
MDC 6: Digestive System	11	9	Down 18%	11	9	Down 18%	14	9	Down 36%		
MDC 19: Mental Disorders	8	6	Down 25%	7	6	Down 14%	13	10	Down 23%		
MDC 14: Pregnancy	7	9	Up 29%	—	—	—	75	76	Up 1%		
MDC 3: Ear, Nose, Mouth, & Throat	6	6	No change	6	5	Down 17%	9	8	Down 11%		
MDC 9: Skin & Breast	6	4	Down 33%	5	3	Down 40%	10	9	Down 10%		
MDC 20: Alcohol & Drugs	6	3	Down 50%	6	3	Down 50%	—	2	—		
MDC 5: Circulatory System	3	3	No change	—	—	—	—	2	—		
MDC 1: Nervous System	4	2	Down 50%	3	2	Down 33%	6	4	Down 33%		
MDC 12: Male Reproductive System	3	2	Down 33%	2	2	No change	—	—	—		
MDC 13: Female Reproductive System	—	—	—	—	—	—	27	21	Down 22%		
MDC 18: Infectious & Parasitic	—	—	—	5	1	Down 80%	—	—	—		
MDC 4: Respiratory System	—	—	—	2	1	Down 50%	—	—	—		
MDC 21: Injury	—	—	—	—	—	—	3	2	Down 33%		
MDC 10: Endocrine, Nutritional, & Metabolic	—	—	—	—	—	—	2	3	Up 50%		

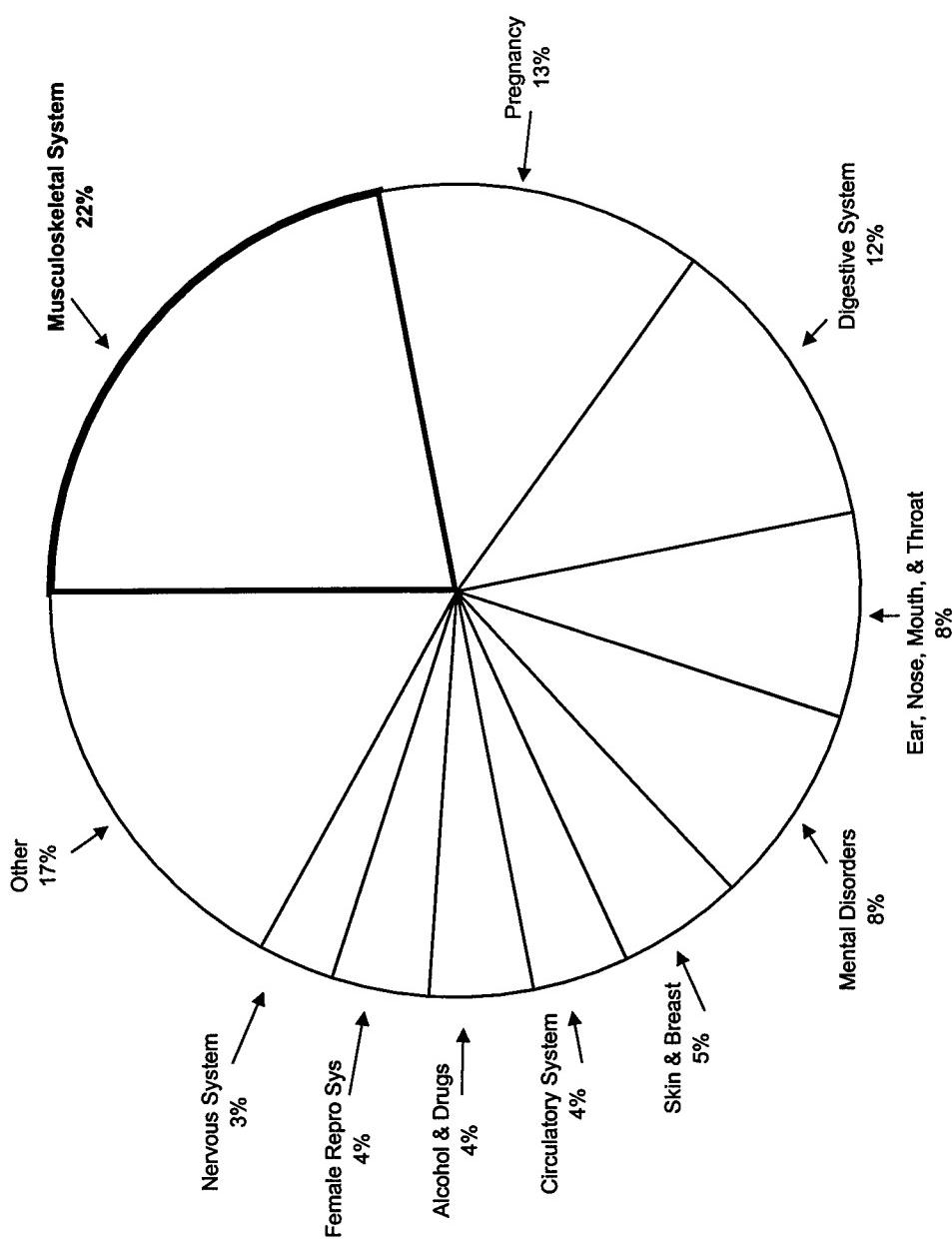
Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.

Figure 5-14 illustrates the distribution of hospitalizations by major diagnostic categories for active duty Navy personnel for FY 1994. Of a total of 32,021 hospitalizations, the top five contributors to hospitalization were:

- Musculoskeletal system (most of which are largely injury related) (MDC 8)—22%.
- Pregnancy (MDC 14)—13%.
- Digestive system (MDC 6)—12%.
- Ear, nose, mouth, and throat (MDC 3)—8%.
- Mental disorders (MDC 19)—8%.

When using MDCs to group hospitalizations of Navy personnel, some hospitalizations coded within the musculoskeletal system group (MDC 8) will actually represent acute injuries. For instance, ligamentous sprains fall into MDC 8, whereas the same injury under the ICD-9 PDG grouping (used here by the Army and Air Force) would fall under the injury PDG.

Navy - Distribution (%) of Hospitalizations by Major Diagnostic Category,* FY 1994



n = 32,021.

* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

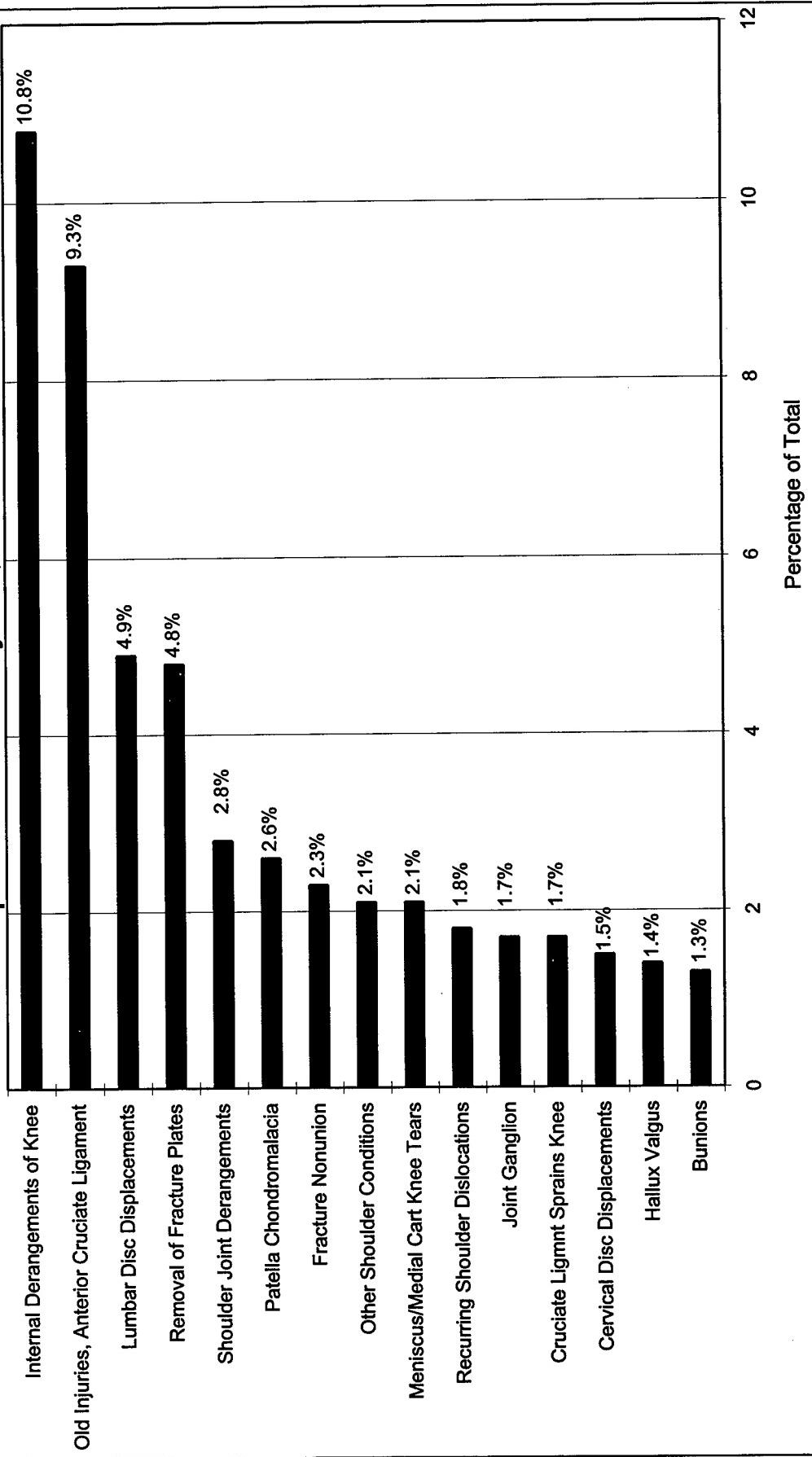
Figure 5-14

Figure 5-15 illustrates the distribution of the top 15 diagnoses in MDC 8 (musculoskeletal system) for hospitalized active duty male Navy personnel for FY 1994. Of a total of 6,241 hospitalizations (see Table 5-8), the top five contributors accounted for 44% of the total:

- Internal derangements of the knee—10.8%.
- Old injuries, anterior cruciate ligament—9.3%.
- Lumbar disc displacements—4.9%.
- Removal of fracture plates—4.8%.
- Shoulder joint derangements—2.8%.

Most of the conditions for men in the musculoskeletal system category appear to be injury related.

Navy - Distribution (%) of Top 15 Musculoskeletal System Diagnoses for Hospitalized Active Duty Men, FY 1994



Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

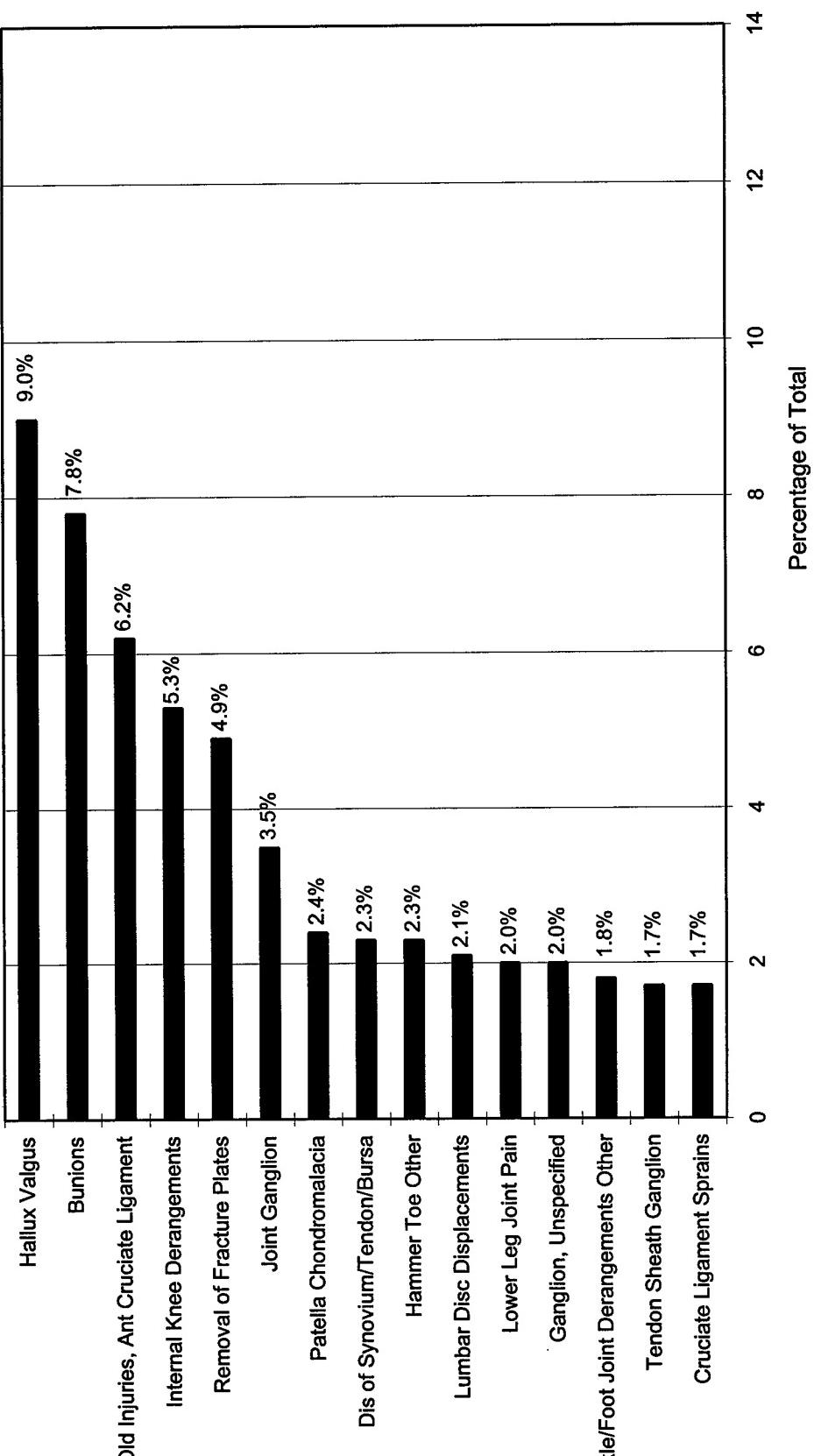
Figure 5-15

Figure 5-16 illustrates the distribution of the top 15 diagnoses in MDC 8 (musculoskeletal system) for hospitalized active duty female Navy personnel for FY 1994. Of a total of 886 hospitalizations (see Table 5-8), the top five contributors accounted for 43% of the total:

- Hallux valgus—9.0%.
- Bunions—7.8%.
- Old injuries, anterior cruciate ligament—6.2%.
- Internal knee derangements—5.3%.
- Removal of fracture plates—4.9%.

Most of the conditions for women, other than hallux valgus and bunions, appear to be injury related.

Navy - Distribution (%) of Top 15 Musculoskeletal System Diagnoses for Hospitalized Active Duty Women, FY 1994



Total musculoskeletal hospitalizations for women = 886.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Trends of Navy Injury-Related Hospitalizations Over Time.

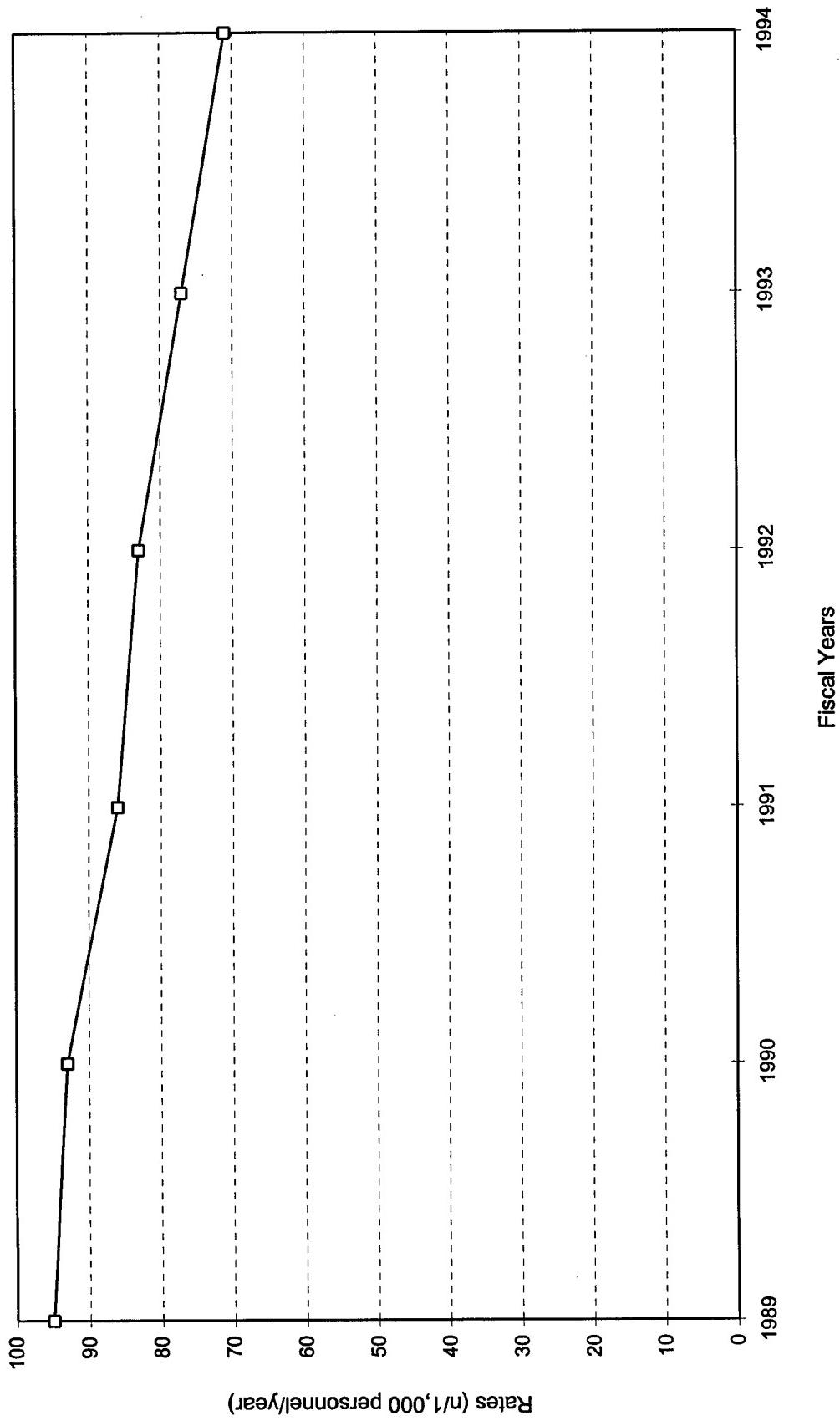
Figure 5-17 illustrates the rates of hospitalization by year for active duty Navy personnel for FY 1989-1994. Hospitalization rates decreased 25% from 95 per 1,000 personnel in FY 1989 to 71 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-17

Navy - Rates of Hospitalization by Fiscal Year*				
1989	1990	1991	1992	1993
95	93	86	83	77

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Navy - Rates of Hospitalization by Year, FY 1989-1994



Numerator Source: Naval Medical Information Management Center, Bethesda, MD, 1995.
Denominator Source (1994): *DOD Worldwide U.S. Active Duty Military Personnel Casualties, Oct 79-Dec 95*. Prepared by DoD,
Washington Headquarters Services, Directorate for Information Operations and Reports (DTIC# DIOR/M07-96/01).

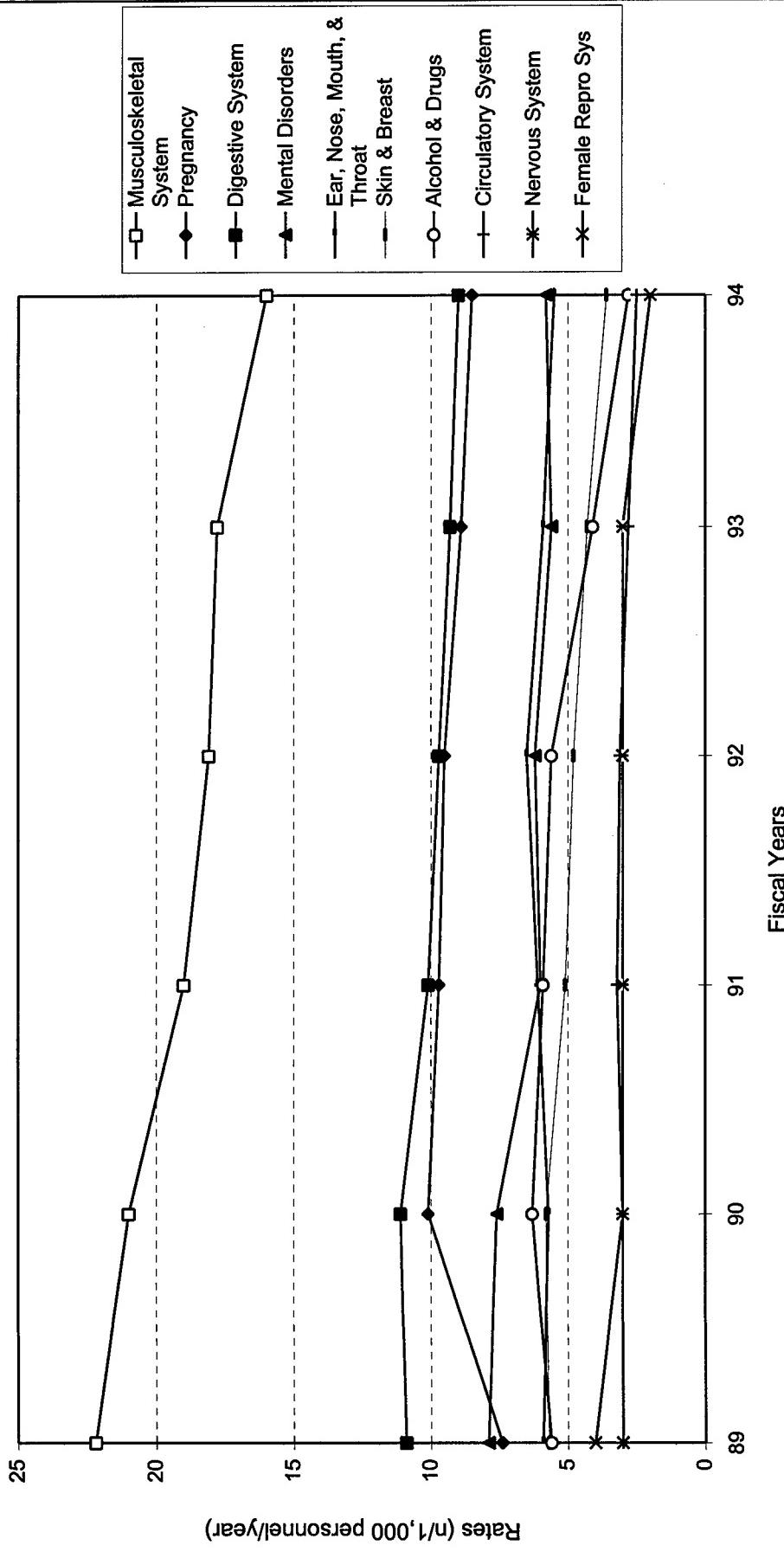
Figure 5-18 illustrates the rates of the top 10 causes of hospitalization by MDC for active duty Navy personnel for FY 1989-1994. Musculoskeletal system diseases decreased 27% from 22 per 1,000 personnel in FY 1989 to 16 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-18

Top 10 Causes of Hospitalization by Major Diagnostic Category (Rank Based on 1994 Data)	Navy - Rates of Hospitalization by Fiscal Year*				
	1989	1990	1991	1992	1993
MDC 8: Musculoskeletal System	22	21	19	18	18
MDC 14: Pregnancy	7	10	10	10	9
MDC 6: Digestive System	11	11	10	10	9
MDC 19: Mental Disorders	8	8	6	6	6
MDC 3: Ear, Nose, Mouth, & Throat	6	6	6	7	6
MDC 9: Skin & Breast	6	6	5	5	4
MDC 20: Alcohol & Drugs	6	6	6	6	4
MDC 5: Circulatory System	3	3	3	3	3
MDC 1: Nervous System	4	3	3	3	2
MDC 13: Female Reproductive System	3	3	3	3	2

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Navy - Rates of Top 10 Causes of Hospitalization by Major Diagnostic Category,* FY 1989-1994



* Major diagnostic categories from the DRG Guidebook, 1996.

Numerator Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Denominator Source (1994): DOD Worldwide U.S. Active Duty Military Personnel Casualties, Oct 79-Dec 95. Prepared by DoD, Washington Headquarters Services, Directorate for Information Operations and Reports (DTIC# DIOR/M07-96/01).

Figure 5-18

Figure 5-19 illustrates the top 10 causes of hospitalization by MDC for active duty male Navy personnel for FY 1989-1994.

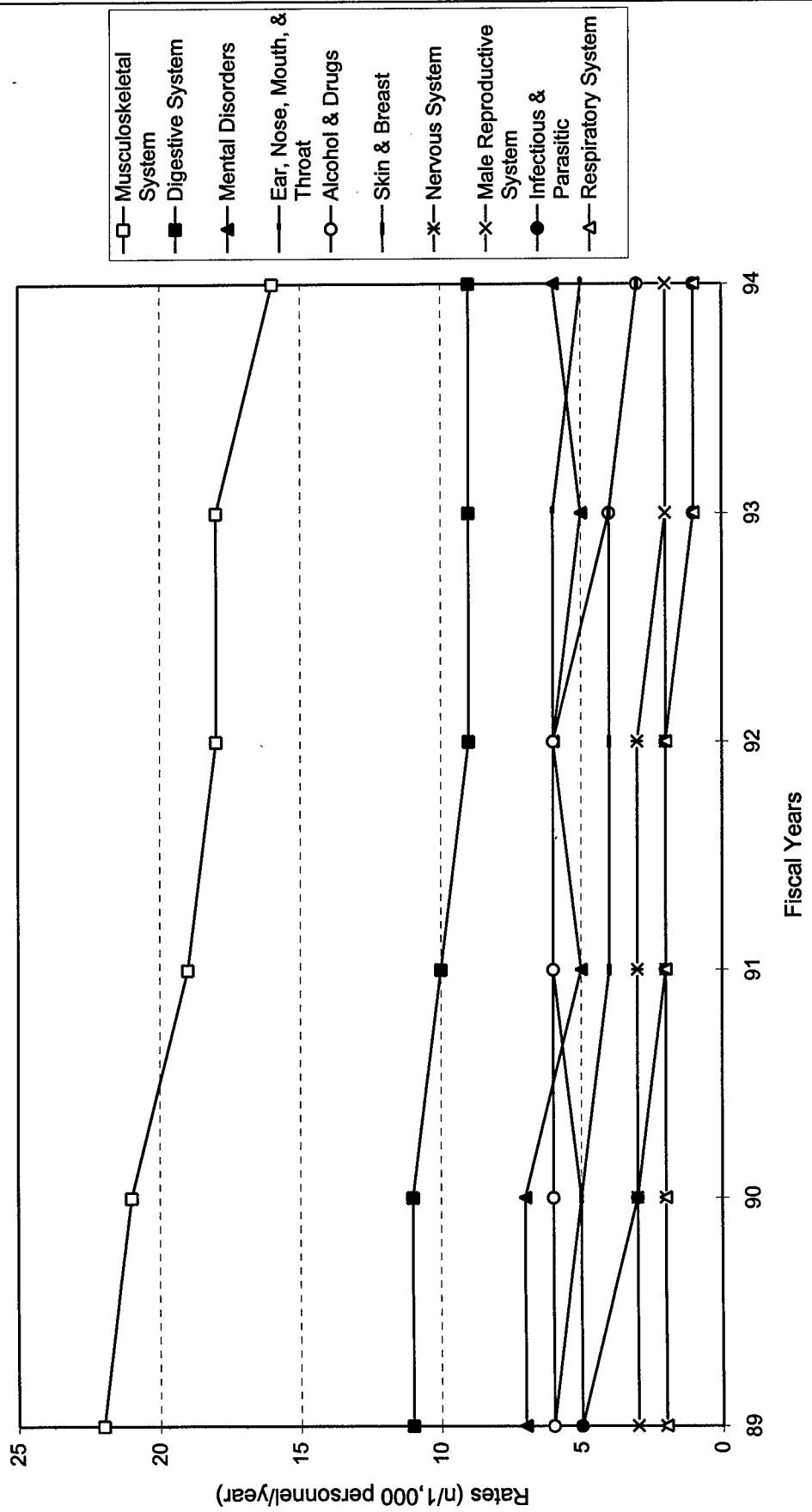
- Hospitalizations due to musculoskeletal system diseases decreased 27% from 22 per 1,000 personnel in FY 1989 to 16 per 1,000 personnel in FY 1994.
- Hospitalizations due to digestive system disorders decreased 18% from 11 per 1,000 personnel in FY 1989 to 9 per 1,000 personnel in FY 1994.
- Hospitalizations for the other causes remained steady over the 6-year period.

Worksheet Data for Figure 5-19

Top 10 Causes of Hospitalization for Men by Major Diagnostic Category (Rank Based on 1994 Data)	Navy - Rates of Hospitalization by Fiscal Year*					
	1989	1990	1991	1992	1993	1994
MDC 8: Musculoskeletal System	22	21	19	18	18	16
MDC 6: Digestive System	11	11	10	9	9	9
MDC 19: Mental Disorders	7	7	5	6	5	6
MDC 3: Ear, Nose, Mouth, & Throat	6	5	6	6	6	5
MDC 20: Alcohol & Drugs	6	6	6	6	4	3
MDC 9: Skin & Breast	5	5	4	4	4	3
MDC 1: Nervous System	3	3	3	3	2	2
MDC 12: Male Reproductive System	2	2	2	2	2	2
MDC 18: Infectious & Parasitic	5	3	2	2	1	1
MDC 4: Respiratory System	2	2	2	2	1	1

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Navy - Rates of Top 10 Causes of Hospitalization for Men by Major Diagnostic Category,* FY 1989-1994



* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-19

Figure 5-20 illustrates the top 10 causes of hospitalization by MDC for active duty female Navy personnel for FY 1989-1994.

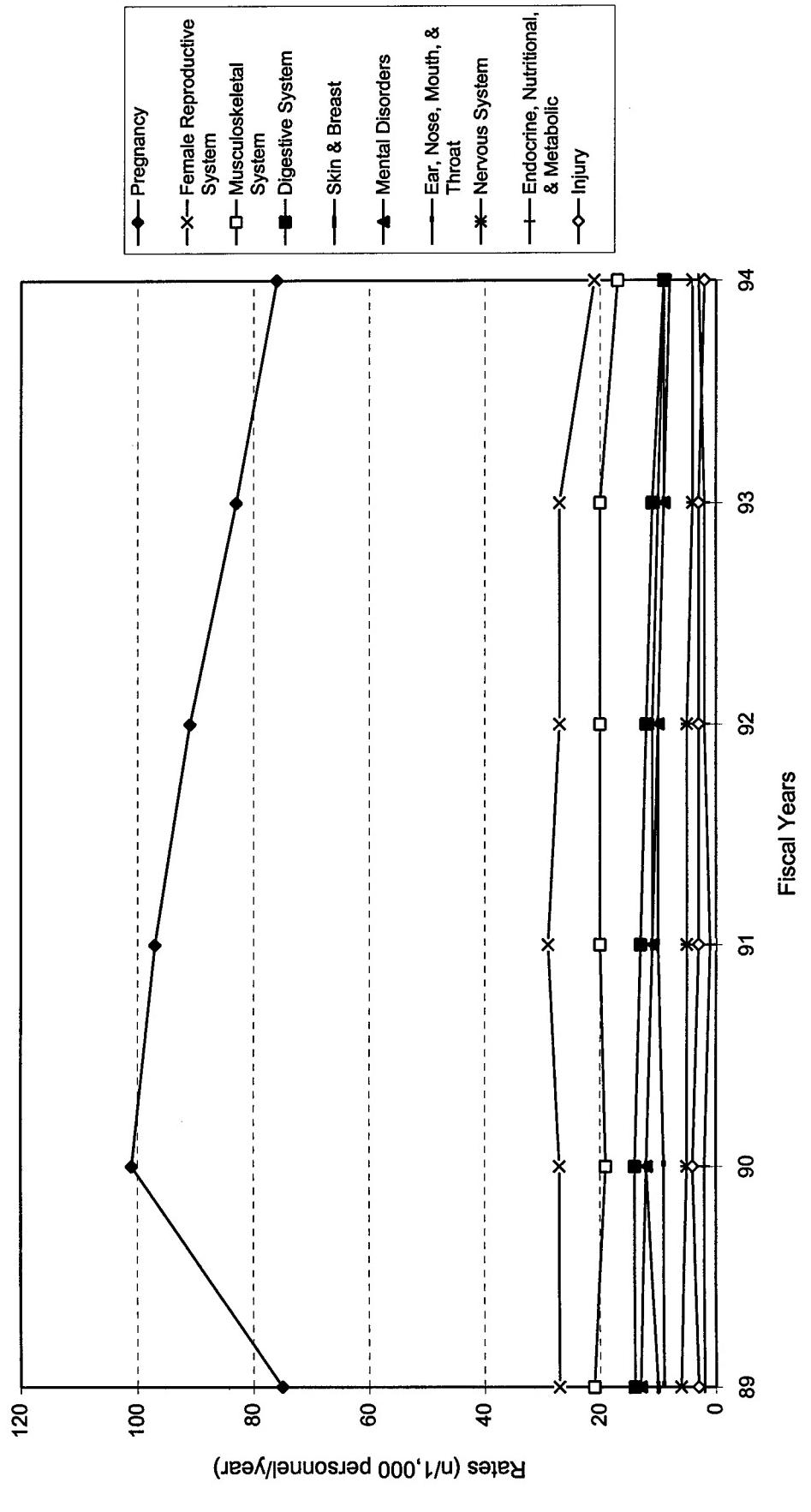
- From FY 1989-1990, there was a notable peak in pregnancies from 75 per 1,000 women to 101 per 1,000 women (up 35%), which subsequently declined in 1994 to the 1989 rate.
- Rates for all other causes declined or remained stable over the 6-year period.
- Musculoskeletal system diseases were the third leading cause of hospitalizations for women in the Navy for the entire period.

Worksheet Data for Figure 5-20

Top 10 Causes of Hospitalization for Women by Major Diagnostic Category (Rank Based on 1994 Data)	Navy - Rates of Hospitalization by Fiscal Year*					
	1989	1990	1991	1992	1993	1994
MDC 14: Pregnancy	75	101	97	91	83	76
MDC 13: Female Reproductive System	27	27	29	27	27	21
MDC 8: Musculoskeletal System	21	19	20	20	20	17
MDC 6: Digestive System	14	14	13	12	11	9
MDC 9: Skin & Breast	10	12	11	11	10	9
MDC 19: Mental Disorders	13	12	11	10	9	9
MDC 3: Ear, Nose, Mouth, & Throat	9	9	10	10	9	8
MDC 1: Nervous System	6	5	5	5	4	4
MDC 10: Endocrine, Nutritional, & Metabolic	2	2	1	2	2	3
MDC 21: Injury	3	4	3	3	3	2

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Navy - Rates of Top 10 Causes of Hospitalization for Women by Major Diagnostic Category,* FY 1989-1994



* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-20

Figure 5-21 illustrates the rates of hospitalization for musculoskeletal system diagnoses for active duty Navy men and women for FY 1989-1994.

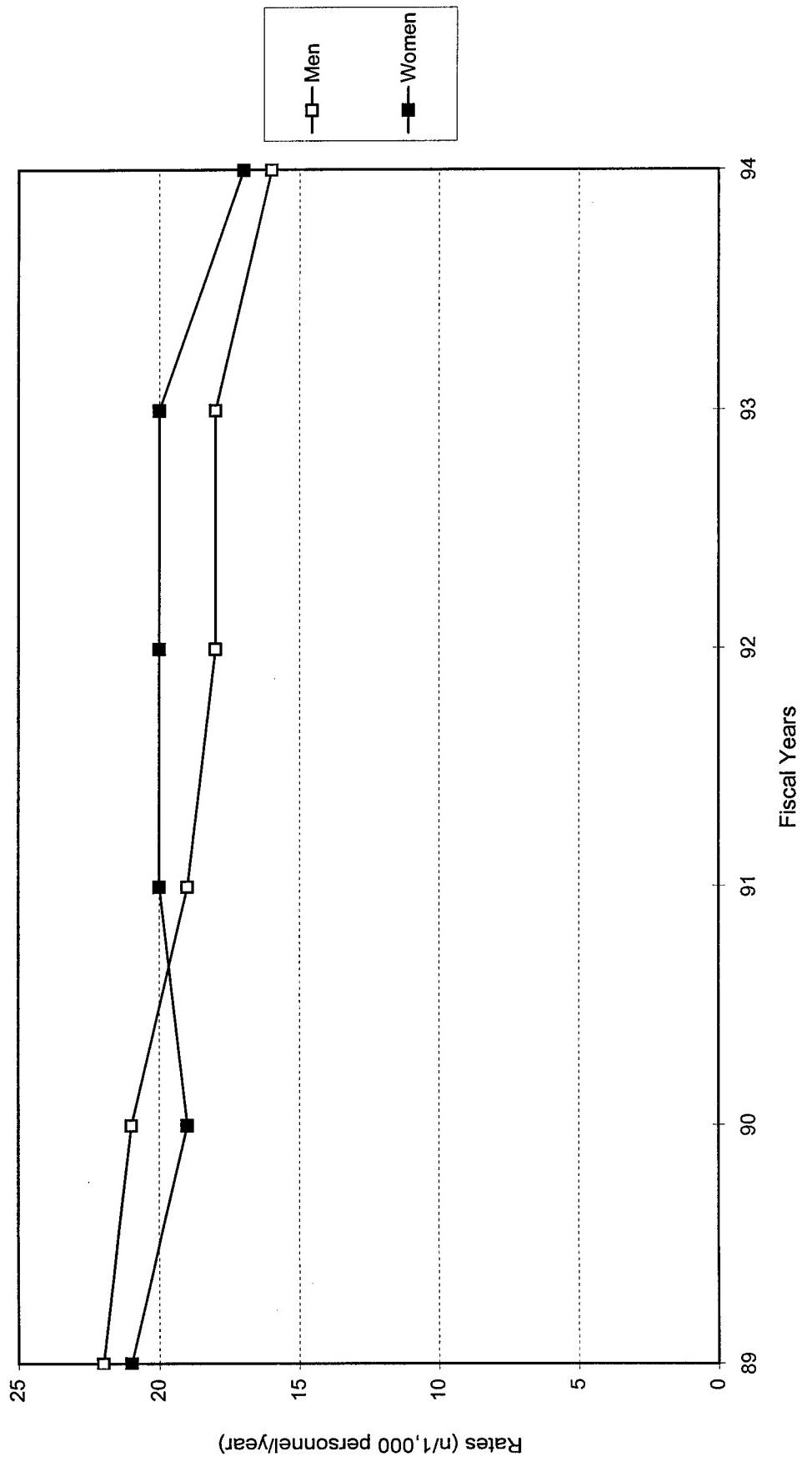
- Musculoskeletal system condition rates for men decreased 27% from 22 per 1,000 personnel in FY 1989 to 16 per 1,000 personnel in FY 1994.
- Musculoskeletal system condition rates for women decreased 19% from 21 per 1,000 personnel in FY 1989 to 17 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-21

Musculoskeletal System Diagnoses	Navy - Rates of Hospitalization by Fiscal Year*				
	1989	1990	1991	1992	1993
Men	22	21	19	18	18
Women	21	19	20	20	17

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Navy - Rates of Hospitalization for Musculoskeletal System Diagnoses for Men and Women, FY 1989-1994



Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-21

Table 5-10 displays the frequency and case rates by major diagnostic categories for hospitalized active duty Navy men and women for FY 1994.

- The top three hospitalization rates for men in 1994 were:
 - Musculoskeletal system (MDC 8)—15.6.
 - Digestive system (MDC 6)—8.6.
 - Mental disorders (MDC 19)—5.5.
- The top three hospitalization rates for women in 1994 were:
 - Pregnancy and childbirth (MDC 14)—76.4.
 - Female reproductive system (MDC 13)—21.5.
 - Musculoskeletal system (MDC 8)—16.9.
- Musculoskeletal system diseases were one of the top three contributors to hospitalization case rates for both men and women.
- Navy men and women had similar rates of musculoskeletal system diseases.

Table 5-10. Navy - Frequency (n) and Case Rates by Major Diagnostic Category for Hospitalized Active Duty Men and Women, FY 1994

Major Diagnostic Categories	Men		Women		Total
	n	Case Rate*	n	Case Rate	
MDC 8: Musculoskeletal System	6,241	15.6	886	16.9	7,127
MDC 6: Digestive System	3,446	8.6	492	9.4	3,938
MDC 19: Mental Disorders	2,209	5.5	495	9.5	2,704
MDC 3: Ear, Nose, Mouth, & Throat	2,117	5.3	440	8.4	2,557
MDC 9: Skin & Breast	1,201	3.0	476	9.1	1,677
MDC 20: Alcohol & Drugs	1,195	3.0	106	2.0	1,301
MDC 5: Circulatory System	1,077	2.7	106	2.0	1,183

Table 5-10.—Continued

Major Diagnostic Categories	Men			Women			Total	
	n	Case Rate*	n	Case Rate	n	Case Rate		
MDC 12: Male Reproductive System	828	2.1	0	0.0	828	1.8		
MDC 1: Nervous System	720	1.8	211	4.0	931	2.1		
MDC 4: Respiratory System	559	1.4	81	1.5	640	1.4		
MDC 21: Injury	533	1.3	109	2.1	642	1.4		
MDC 11: Kidney & Urinary	486	1.2	103	2.0	589	1.3		
Ungroupable	438	1.01	89	1.7	527	1.2		
MDC 18: Infectious & Parasitic	363	0.9	55	1.01	418	0.9		
MDC 2: Eye	360	0.9	46	0.9	406	0.9		
MDC 7: Liver & Pancreas	297	0.7	86	1.6	383	0.8		
MDC 23: Health Status	231	0.6	47	0.9	278	0.6		
MDC 10: Endocrine, Nutritional, & Metabolic	203	0.5	151	2.9	354	0.8		
MDC 17: Neoplasms	175	0.4	32	0.6	207	0.5		
MDC 16: Blood & Immunology	142	0.4	25	0.5	167	0.4		
MDC 22: Burns	35	0.1	1	0.0	36	0.1		
MDC 13: Female Reproductive System	0	0.0	1125	21.5	1125	2.5		
MDC 14: Pregnancy	0	0.0	4003	76.4	4003	8.8		
Totals	22856	57.0	9165	174.9	32021	3.9		

* Case rate = number of persons hospitalized per 1,000 personnel per year.

Source: Naval Medical Information Management Center, Bethesda, MD, 1996. Rates calculated using population data in Table 1-8.

5-8. Marine Corps

The Marine Corps hospitalization data are presented in three parts:

- The Marine Corps Summary. The Marine Corps hospitalization data presented in this section are summarized in three tables.
 - The overall summary is presented in Table 5-11.
 - The data in figures 5-23 and 5-24 are presented in Table 5-12.
 - The data in figures 5-26, 5-27, and 5-28 are summarized in Table 5-13.
- Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.
 - The distribution of hospitalizations by major diagnostic categories for FY 1994 is displayed in Figure 5-22.
 - The distribution of the top 15 musculoskeletal system diagnoses for hospitalized men and women for FY 1994 is displayed in figures 5-23 and 5-24, respectively.
- Trends of Marine Corps Total Hospitalizations Over Time.
 - The rates of hospitalization by year for FY 1989-1994 are displayed in Figure 5-25.
 - The rates of the top 10 causes of hospitalization for all personnel, men, and women by year for FY 1989-1994 are displayed in figures 5-26, 5-27, and 5-28, respectively.
 - The rates of hospitalization for musculoskeletal system diagnoses for men and women for FY 1989-1994 are displayed in Figure 5-29.
 - The frequency and case rates by major diagnostic categories for hospitalized men and women for FY 1994 is presented in Table 5-14.

The Marine Corps Summary.

Table 5-11. Overall Summary of Hospitalization Data for Active Duty Marine Corps Personnel

Year	Marine Corps Population	Hospitalizations		Rates and Trends of Hospitalizations		Conclusion
		Total	n/1,000 Personnel/Year	n/1,000 Personnel/Year	Trend, % Change (CY 1989-1994)	
FY89-94	—	—	—	83 (FY89) —	61 (FY94) —	Down 27% —
FY94	174,639	10,992	61	—	—	Hospitalization rates among Marines decreased over the 6-year period, FY 1989-1994.

Table 5-12. Summary of Hospitalizations by the Top 15 Musculoskeletal System Diagnoses for Active Duty Marine Corps Men and Women, FY 1994

Top 15 Musculoskeletal System Diagnoses	Distribution (%) of Hospitalizations				Conclusion
	Men (n = 3,010)		Women (n = 181)		
	%	Rank	%	Rank	
Internal Derangement of the Knee	10.8%	1	5.0%	4	Many of the musculoskeletal system diagnoses appear to be injury related.
Old Injuries, Anterior Cruciate Ligament	9.7%	2	3.9%	—	
Removal of Fracture Plates	4.8%	3	6.6%	2	
Shoulder Joint Derangements	4.0%	4	—	—	
Lumbar Disc Displacements	3.7%	5	1.7%	—	
Fracture Nonunion	2.8%	—	2.2%	—	
Patella Chondromalacia	2.8%	—	3.3%	—	
Bunions	2.5%	—	11.0%	1	
Lower Leg Joint Derangements	2.0%	—	1.7%	—	
Recurring Shoulder Dislocations	1.9%	—	—	—	
Lower Leg Joint Pain	1.7%	—	2.8%	—	
Other Dis/Cond of Shoulder	1.6%	—	—	—	
Hallux Valgus	1.6%	—	6.1%	3	
Closed Ankle Fractures, Unspecified	1.5%	—	—	—	
Ankle/Foot Joint Derangements Other	1.3%	—	2.2%	—	
Joint Ganglion	—	—	1.7%	—	
Lumbago	—	—	2.2%	—	
Hammer Toe Other	—	—	4.4%	5	
Tendon Sheath Ganglion	—	—	1.7%	—	

Table 5-13. Rates of Top 10 Causes of Hospitalization for Active Duty Marine Corps Personnel, FY 1989-1994

Top 10 Causes of Hospitalization	Rates Per 1,000 Personnel/Year						Conclusions
	Total		Men		Women		
	FY 1989	FY 1994	% Change (FY 89-94)	FY 1989	FY 1994	% Change (FY 89-94)	
MDC 8: Musculoskeletal System	22	18	Down 18%	22	17	Down 23%	25 22 Down 12%
MDC 6: Digestive System	10	7	Down 30%	10	7	Down 30%	14 8 Down 43%
MDC 20: Alcohol & Drugs	10	5	Down 50%	10	5	Down 50%	8 4 Down 50%
MDC 3: Ear, Nose, Mouth, & Throat	4	4	No change	4	4	No change	6 8 Up 33%
MDC 19: Mental Disorders	4	4	No change	4	4	No change	10 9 Down 10%
MDC 9: Skin & Breast	6	4	Down 33%	6	3	Down 50%	10 6 Down 40%
MDC 14: Pregnancy	4	3	Down 25%	—	—	—	85 70 Down 18%
MDC 4: Respiratory System	2	3	Up 50%	2	3	Up 50%	— — —
MDC 18: Infectious & Parasitic	—	—	—	4	1	Down 75%	— — —
MDC 12: Male Repro System	2	2	No change	—	—	—	— — —
MDC 13: Female Repro System	—	—	—	—	—	—	33 22 Down 33%
MDC 11: Kidney & Urinary	—	—	—	—	—	—	5 3 Down 40%
MDC 1: Nervous System	3	2	Down 33%	3	2	Down 33%	6 3 Down 50%
MDC 5: Circulatory System	—	—	—	2	2	No change	— — —

- For both men and women, rates of musculoskeletal system diseases declined in the 6 years from FY 1989-1994. However, musculoskeletal system diseases still remains the leading cause of hospitalization.
- The percentage of musculoskeletal system diseases were lower for men than for women from FY 1989 to 1994.
- Overall, alcohol/drug hospitalization rates showed the greatest decline over this 6-year period.

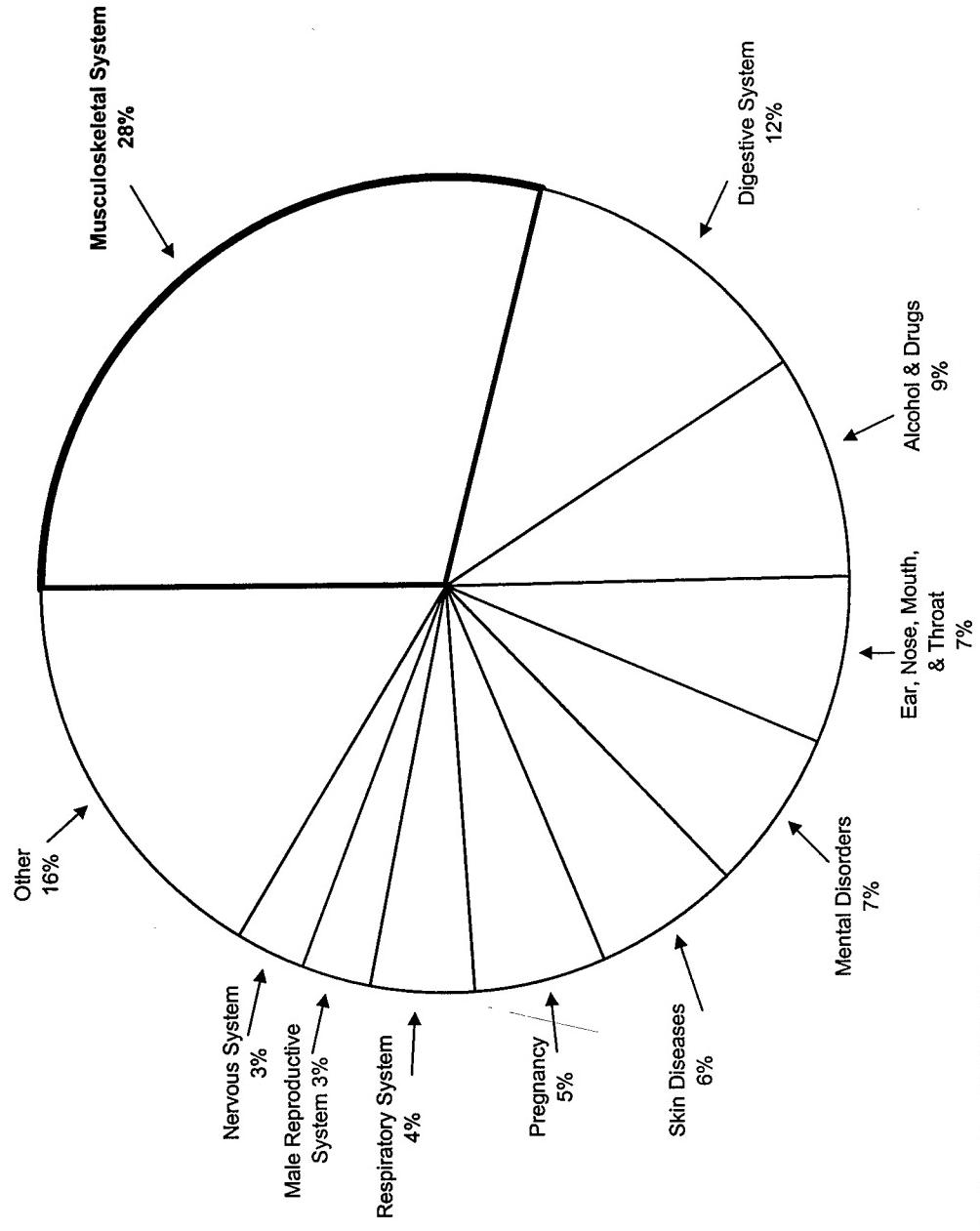
Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.

Figure 5-22 illustrates the distribution of 10,992 hospitalizations by major diagnostic categories for active duty Marine Corps personnel for FY 1994. The top five contributors accounted for 63% of all hospitalizations:

- Musculoskeletal system (MDC 8)—28%.
- Digestive system (MDC 6)—12%.
- Alcohol/drugs (MDC 20)—9%.
- Ear, nose, mouth, and throat (MDC 3)—7%.
- Mental disorders (MDC 19)—7%.

In the MDC scheme, virtually all injuries are included in the musculoskeletal system group. As a result, the injury MDC is not ranked as one of the top 10 contributors to hospitalizations.

Marine Corps - Distribution (%) of Hospitalizations by Major Diagnostic Category,* FY 1994



n = 10,992.

* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

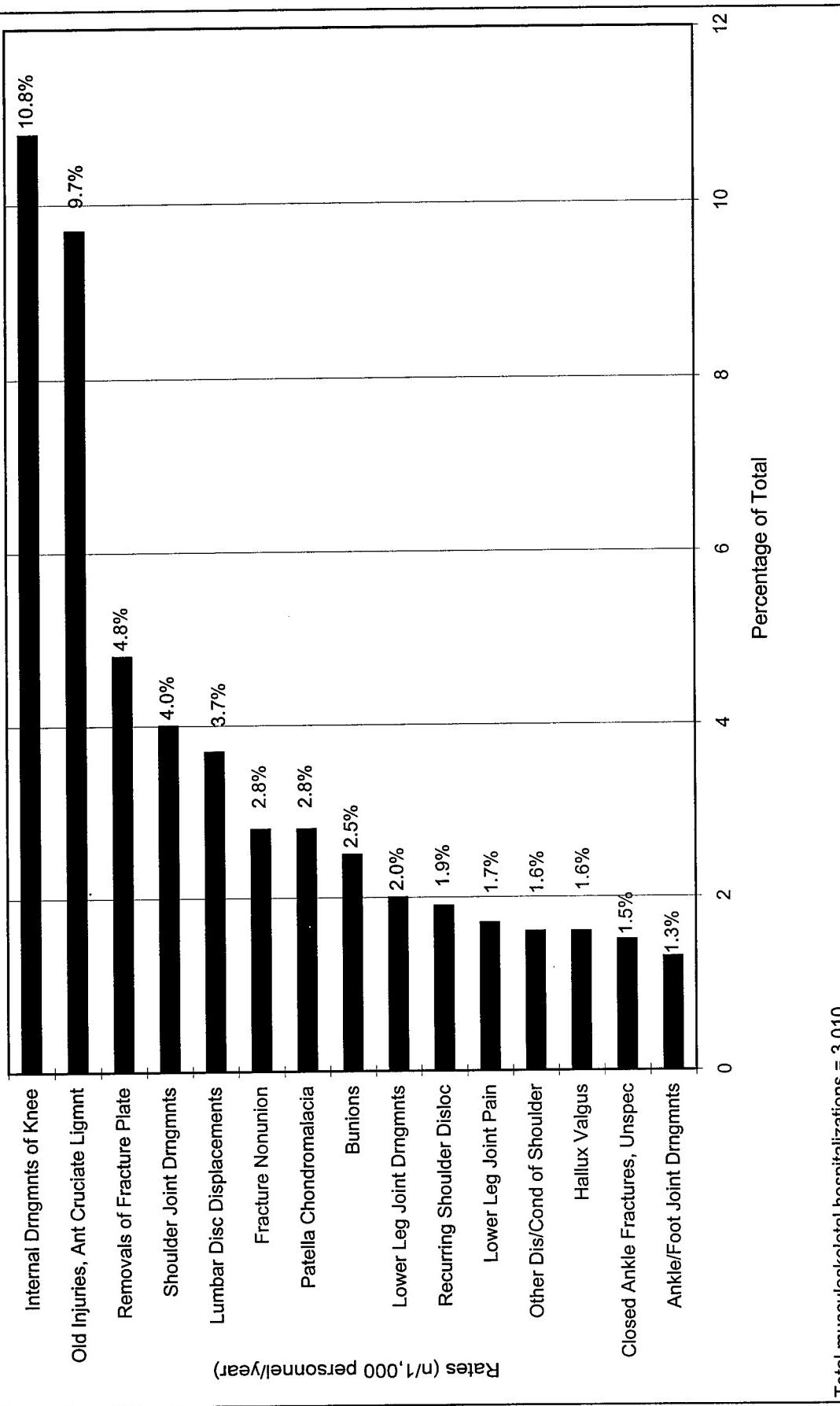
Figure 5-22

Figure 5-23 illustrates the distribution of the top 15 musculoskeletal system diagnoses for hospitalized active duty male Marine Corps personnel for FY 1994. Of a total of 3,010 hospitalizations, the top five contributors accounted for 33% of all hospitalizations:

- Internal derangement of the knee—10.8%.
- Old injury of anterior cruciate ligament—9.7%.
- Removal of fracture plate—4.8%.
- Shoulder joint derangement—4.0%.
- Lumbar disc displacement—3.7%.

Among male Marine Corps personnel, most of these musculoskeletal system diseases appear to be injury related.

Marine Corps - Distribution (%) of Top 15 Musculoskeletal System Diagnoses for Hospitalized Men, FY 1994



Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-23

Figure 5-24 illustrates the top 15 musculoskeletal system diagnoses for hospitalized active duty female Marine Corps personnel for FY 1994. Of a total of 181 hospitalizations, the top five contributors accounted for 23% of all hospitalizations:

- Bunion—11.0%.
- Removal of fracture plate—6.6%.
- Hallux valgus—6.1%.
- Internal derangement of the knee—5.0%.
- Hammer toe other—4.4%.

Among female Marine Corps personnel, many of these musculoskeletal system diseases appear to be injury related.

Marine Corps - Distribution (%) of Top 15 Musculoskeletal System Diagnoses for Hospitalized Women, FY 1994

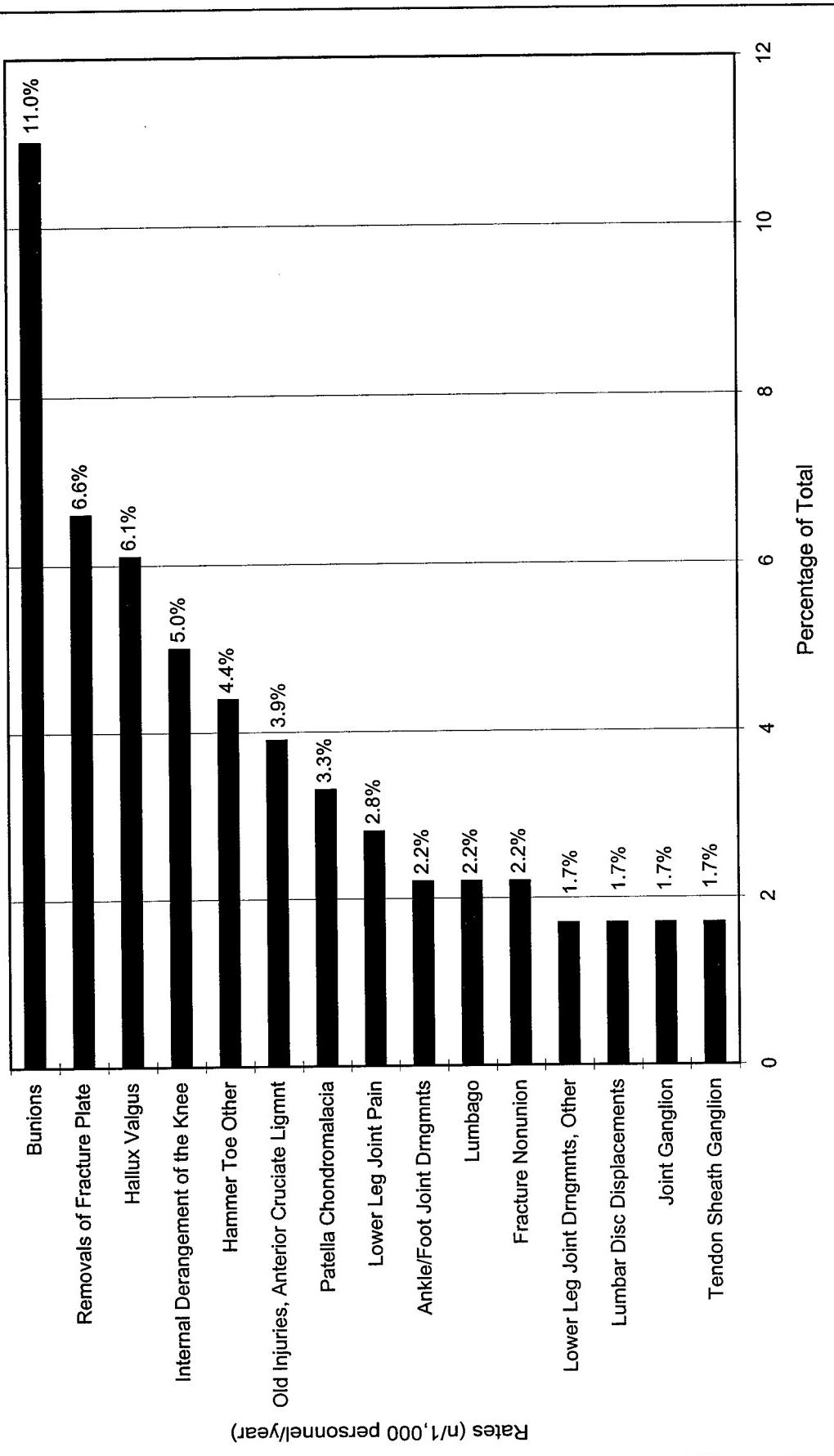


Figure 5-24

Trends of Marine Corps Total Hospitalizations Over Time.

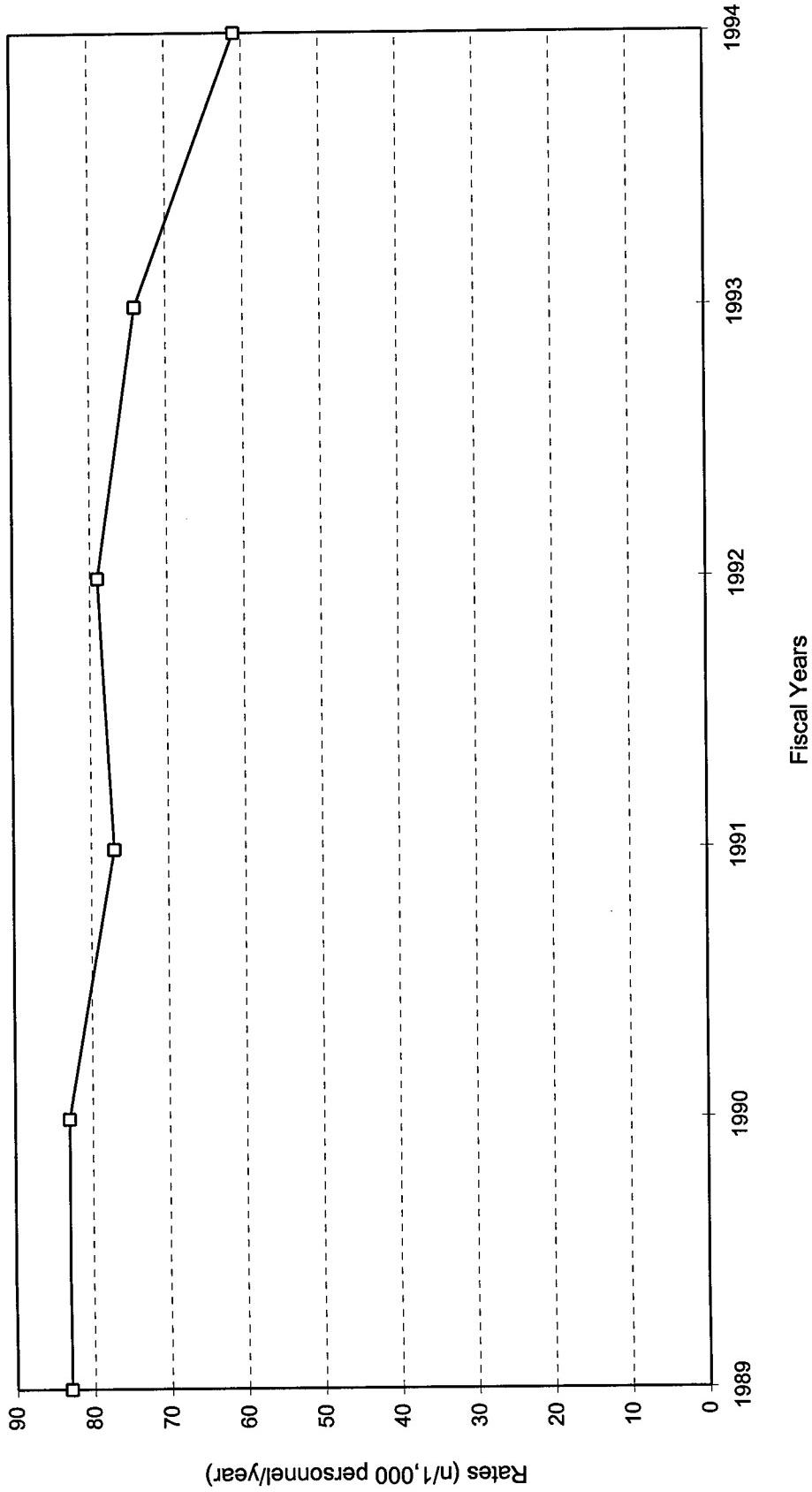
Figure 5-25 illustrates the rates of hospitalization by year for active duty Marine Corps personnel for FY 1989-1994. Hospitalization rates decreased 27% from 83 per 1,000 personnel in FY 1989 to 61 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-25

Marine Corps - Rates of Hospitalization by Fiscal Year*					
1989	1990	1991	1992	1993	1994
83	83	77	79	74	61

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Marine Corps - Rates of Hospitalization by Year, FY 1989-1994



Numerator Source: Naval Medical Information Management Center, Bethesda, MD, 1995.
Denominator Source: DoD Worldwide U.S. Active Duty Military Personnel Casualties, Oct 79-Dec 95. Prepared by DoD,
Washington Headquarters Services, Directorate for Information Operations and Reports (DTIC# DIOR/M07-96/01).

Figure 5-25

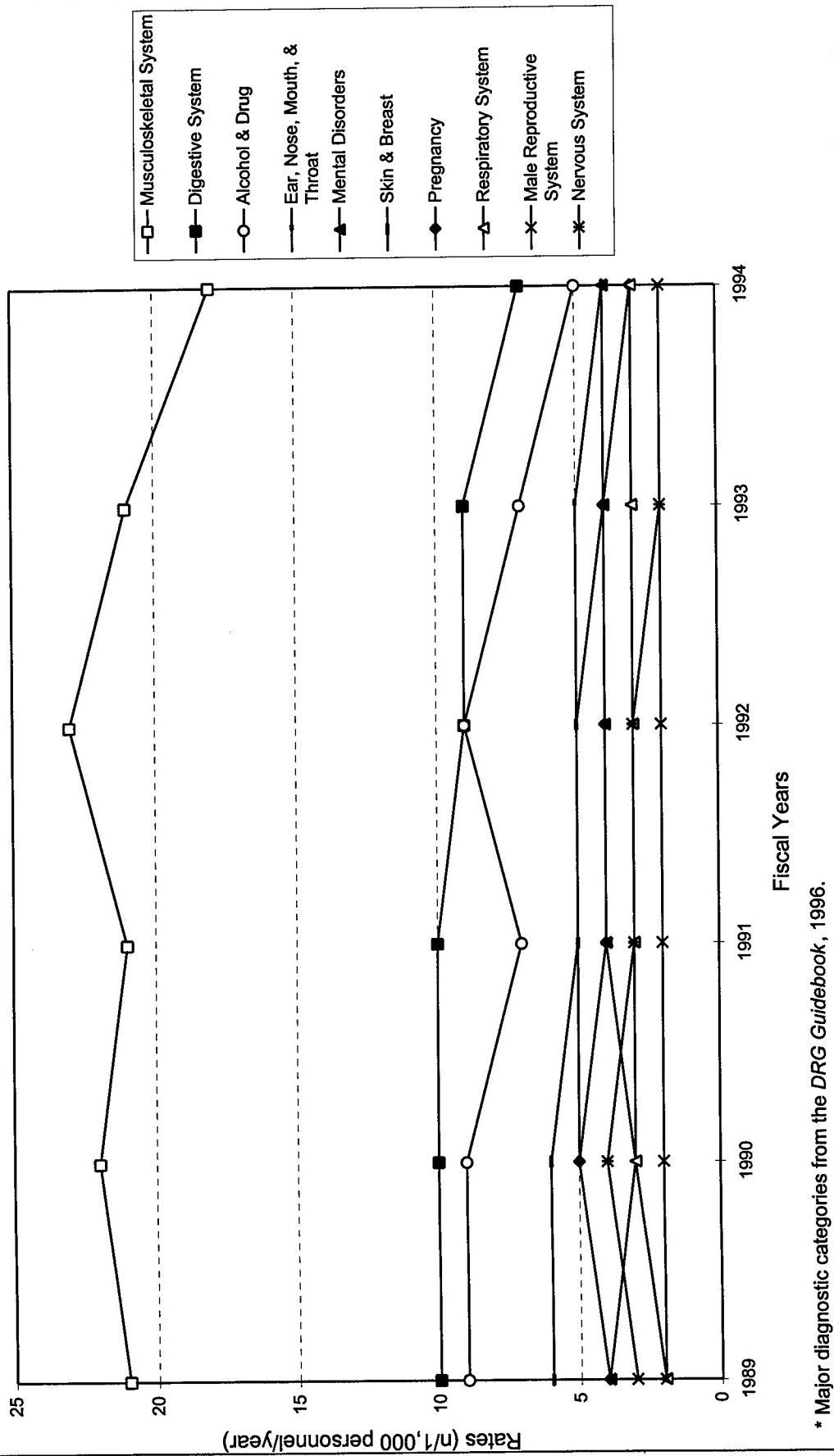
Figure 5-26 illustrates the rates of the top 10 causes of hospitalization by MDC for active duty Marine Corps personnel for FY 1989-1994. Musculoskeletal system diseases decreased 18% from 22 per 1,000 personnel in FY 1989 to 18 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-26

Top 10 Causes of Hospitalization by Major Diagnostic Category (Rank Based on 1994 Data)	Marine Corps - Rates of Hospitalization by Fiscal Year*					
	1989	1990	1991	1992	1993	1994
MDC 8: Musculoskeletal System	22	22	21	23	21	18
MDC 6: Digestive System	10	10	10	9	9	7
MDC 20: Alcohol & Drugs	10	9	7	9	7	5
MDC 3: Ear, Nose, Mouth, & Throat	4	5	5	5	5	4
MDC 19: Mental Disorders	4	3	4	4	4	4
MDC 9: Skin & Breast	6	6	5	5	5	4
MDC 14: Pregnancy	4	5	4	4	4	3
MDC 4: Respiratory System	2	3	3	3	3	3
MDC 12: Male Reproductive System	2	2	2	2	2	2
MDC 1: Nervous System	3	4	3	3	2	2

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Marine Corps - Rates of Top 10 Causes of Hospitalization by Major Diagnostic Category,* FY 1989-1994



* Major diagnostic categories from the DRG Guidebook, 1996.

Numerator Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Denominator Source: DoD Worldwide U.S. Active Duty Military Personnel Casualties, Oct 79-Dec 95. Prepared by DoD, Washington Headquarters Services, Directorate for Information Operations and Reports (DTIC# DIOR/M07-96/01).

Figure 5-26

Figure 5-27 illustrates the top 10 causes of hospitalization by MDC for active duty male Marine Corps personnel for FY 1989-1994.

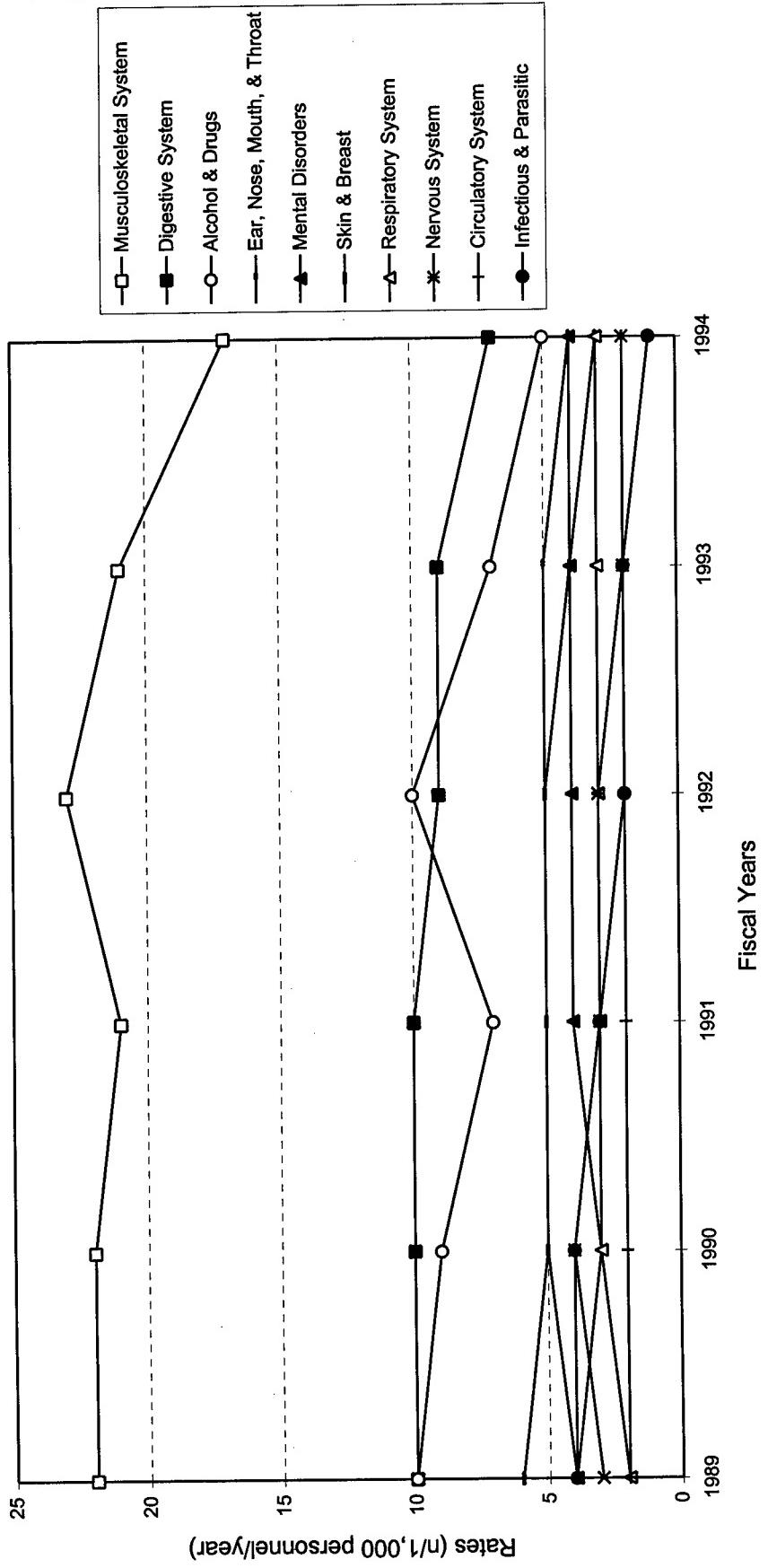
- Rates of musculoskeletal system hospitalizations decreased 23% from 22 per 1,000 personnel in FY 1989 to 17 per 1,000 personnel in FY 1994.
- Rates of musculoskeletal system hospitalizations were between two to three times higher than the rates for the second and third leading categories, digestive system and alcohol and drugs, respectively.
- Rates of most other categories of hospitalization remained fairly constant among the top 10 for men with a possible decrease in infectious disease rates.

Worksheet Data for Figure 5-27

Top 10 Causes of Hospitalization for Men by Major Diagnostic Category (Rank Based on 1994 Data)	Marine Corps - Rates of Hospitalization by Fiscal Year*					
	1989	1990	1991	1992	1993	1994
MDC 8: Musculoskeletal System	22	22	21	23	21	17
MDC 6: Digestive System	10	10	10	9	9	7
MDC 20: Alcohol & Drugs	10	9	7	10	7	5
MDC 3: Ear, Nose, Mouth, & Throat	4	5	5	5	5	4
MDC 19: Mental Disorders	4	3	4	4	4	4
MDC 9: Skin & Breast	6	5	5	5	4	3
MDC 4: Respiratory System	2	3	3	3	3	3
MDC 1: Nervous System	3	4	3	3	2	2
MDC 5: Circulatory System	2	2	2	2	2	2
MDC 18: Infectious & Parasitic	4	4	3	2	2	1

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Marine Corps - Rates of Top 10 Causes of Hospitalization for Men by Major Diagnostic Category,* FY 1989-1994



* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-27

Figure 5-28 illustrates the top 10 causes of hospitalization by MDC for active duty female Marine Corps personnel for FY 1989-1994.

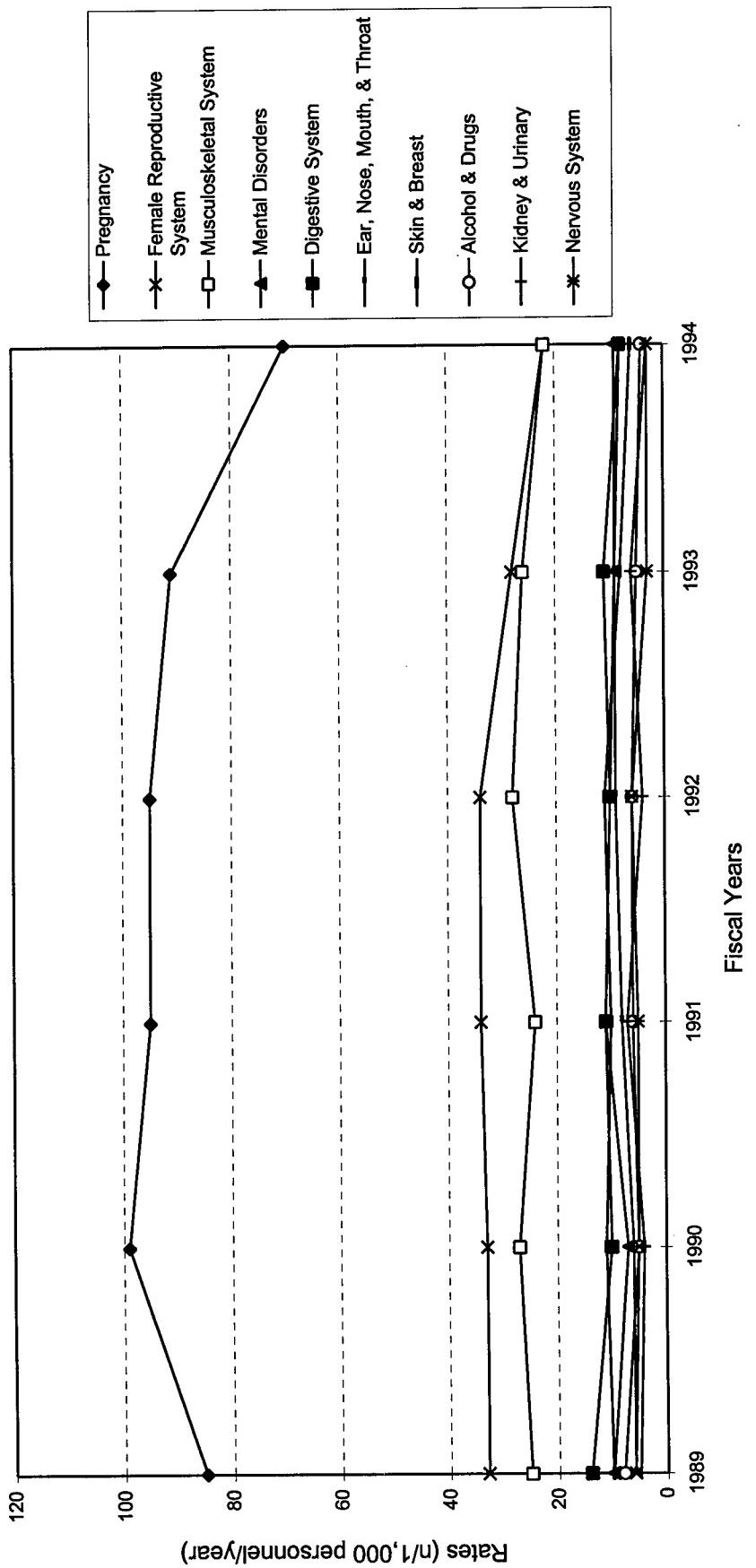
- Musculoskeletal system diseases were the third most common reason for hospitalizations among women in the Marine Corps.
- Rates of musculoskeletal system diseases decreased only 12% from FY 1989-1994.
- Although musculoskeletal system diseases were only the third leading cause of hospitalizations among women, the rates were higher than for men, for whom they were number one.

Worksheet Data for Figure 5-28

Top 10 Causes of Hospitalization for Women by Major Diagnostic Category (Rank Based on 1994 Data)	Marine Corps - Rates of Hospitalization by Fiscal Year*					
	1989	1990	1991	1992	1993	1994
MDC 14: Pregnancy	85	99	95	95	91	70
MDC 13: Female Reproductive System	33	33	34	34	28	22
MDC 8: Musculoskeletal System	25	27	24	28	26	22
MDC 6: Digestive System	14	10	11	10	11	8
MDC 19: Mental Disorders	10	7	11	10	9	9
MDC 3: Ear, Nose, Mouth, & Throat	6	6	8	9	9	8
MDC 9: Skin & Breast	10	11	10	11	8	6
MDC 20: Alcohol & Drug	8	5	6	6	5	4
MDC 11: Kidney & Urinary	5	4	7	4	6	3
MDC 1: Nervous System	6	5	5	6	3	3

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

**Marine Corps - Rates of Top 10 Causes of Hospitalization for Women
by Major Diagnostic Category,* FY 1989-1994**



* Major diagnostic categories from the DRG Guidebook, 1996.

Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-28

Figure 5-29 illustrates the rates of hospitalization for musculoskeletal system diagnoses for active duty Marine Corps men and women for FY 1989-1994.

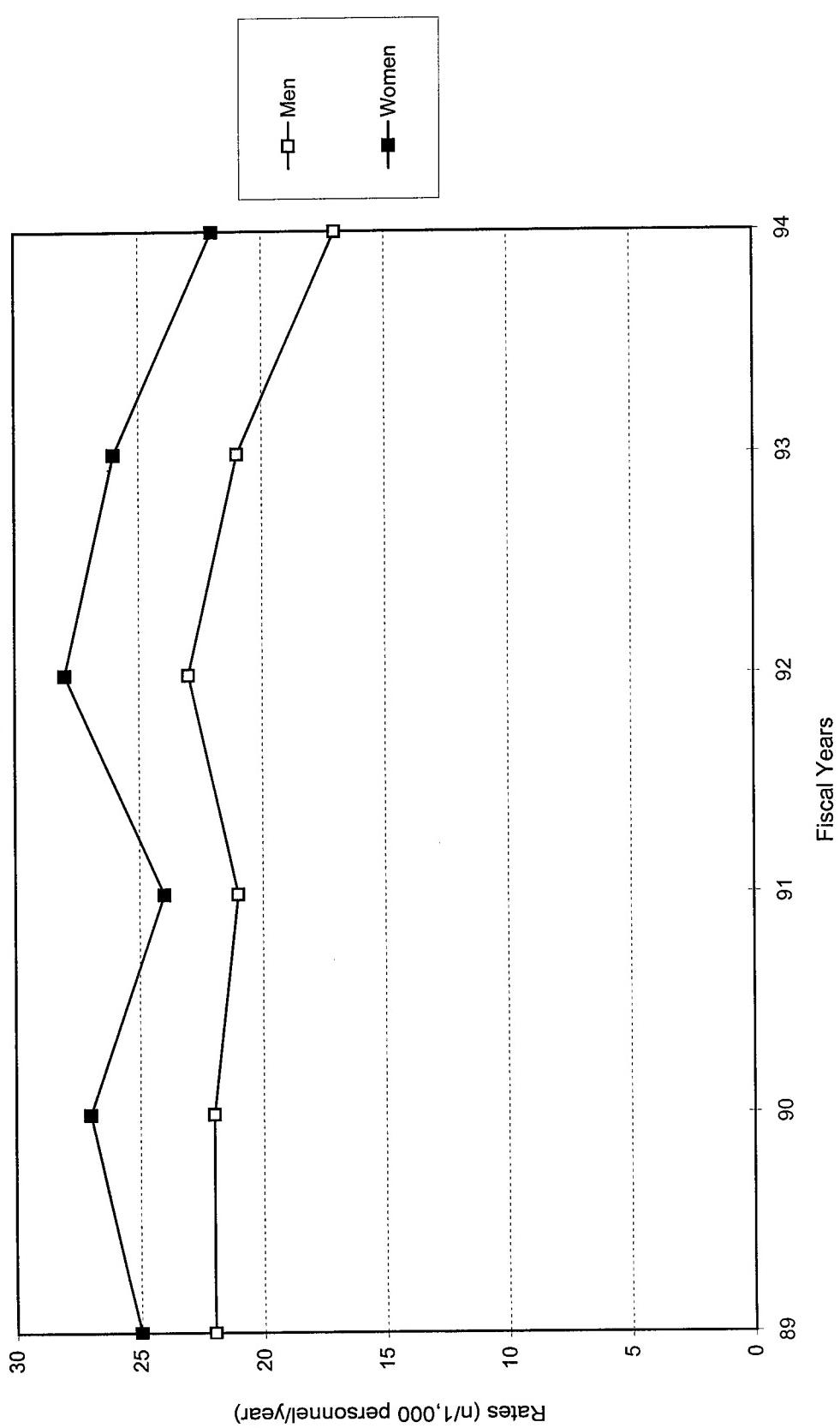
- Musculoskeletal system condition rates for women decreased 12% from 25 per 1,000 personnel in FY 1989 to 22 per 1,000 personnel in FY 1994.
- Musculoskeletal system condition rates for men decreased 23% from 22 per 1,000 personnel in FY 1989 to 17 per 1,000 personnel in FY 1994.

Worksheet Data for Figure 5-29

Musculoskeletal System Diagnoses	Marine Corps - Rates of Hospitalization by Fiscal Year*				
	1989	1990	1991	1992	1993
Women	25	27	24	28	26
Men	22	22	21	23	21

* Rates per 1,000 personnel calculated using denominator data in Table 1-8.

Marine Corps - Rates of Hospitalization for Musculoskeletal System Diagnoses for Men and Women, FY 1989-1994



Source: Naval Medical Information Management Center, Bethesda, MD, 1995.

Figure 5-29

Table 5-14 displays the frequency and case rates by major diagnostic categories for hospitalized active duty Marine Corps men and women for FY 1994.

- The top three hospitalization rates for men in 1994 were:
 - Musculoskeletal system (MDC 8)—17.4.
 - Digestive system (MDC 6)—7.2.
 - Alcohol and drugs (MDC 20)—5.4.
- The top three hospitalization rates for women in 1994 were:
 - Pregnancy and childbirth (MDC 14)—70.3.
 - Female reproductive system (MDC 13)—22.4.
 - Musculoskeletal system (MDC 8)—22.1.
- Musculoskeletal system diseases were one of the top three contributors to hospitalization case rates for both men and women.

Table 5-14. Marine Corps - Frequency (n) and Case Rates by Major Diagnostic Category for Hospitalized Active Duty Men and Women, FY 1994

Major Diagnostic Categories	Men		Women		Total	
	n	Case Rate*	n	Case Rate	n	Case Rate
MDC 8: Musculoskeletal System	3,010	17.4	181	22.1	3,191	17.6
MDC 6: Digestive System	1,240	7.2	64	7.8	1,304	7.2
MDC 20: Alcohol & Drugs	928	5.4	31	3.8	959	5.3
MDC 3: Ear, Nose, Mouth, & Throat	669	3.9	67	8.2	736	4.1
MDC 19: Mental Disorders	644	3.7	72	8.8	716	4.0
MDC 9: Skin & Breast	590	3.4	48	5.9	638	3.5
MDC 14: Pregnancy	0	0.0	575	70.3	575	3.2
MDC 4: Respiratory System	440	2.5	17	2.1	457	2.5
MDC 12: Male Reproductive System	308	1.8	0	0.0	308	1.7
MDC 1: Nervous System	282	1.6	25	3.1	307	2
MDC 5: Circulatory System	293	1.7	10	1.2	303	1.7
MDC 21: Injury	275	1.6	22	2.7	297	1.6
MDC 18: Infectious & Parasitic	185	1.1	9	1.1	194	1.1
MDC 13: Female Reproductive System	0	0.0	183	22.4	183	1.0
MDC 11: Kidney & Urinary	132	0.8	26	3.2	158	0.9
Ungroupable	125	0.7	14	1.7	139	0.8

Table 5-14.—Continued

Major Diagnostic Categories	Men			Women			Total
	n	Case Rate*	n	Case Rate	n	Case Rate	
MDC 2: Eye	124	0.7	2	0.2	126	0.7	
MDC 23: Health Status	87	0.5	5	0.6	92	0.5	
MDC 10: Endocrine, Nutritional, & Metabolic	79	0.5	15	1.8	94	0.5	
MDC 7: Liver & Pancreas	77	0.4	9	1.1	86	0.5	
MDC 16: Blood & Immunology	56	0.3	4	0.5	60	0.3	
MDC 17: Neoplasms	51	0.3	3	0.4	54	0.3	
MDC 22: Burns	15	0.1	0	0.0	15	0.1	
Totals	9610	55.7	1382	169.0	10992	61.0	

* Case rate = number of persons hospitalized per 1,000 personnel per year.

Source: Naval Medical Information Management Center, Bethesda, MD, 1996. Rates calculated using population data in Table 1-8.

5-9. Air Force

The Air Force hospitalization data are presented in four parts:

- The Air Force Summary. The Air Force hospitalization data presented in this section are summarized in three tables.
 - The overall summary is presented in Table 5-15.
 - The data in figures 5-30 and 5-31 are summarized in Table 5-16.
 - The data in figures 5-34, 5-36, and 5-37 are summarized in Table 5-17.
- Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.
 - The distribution of hospitalizations and non-effective days due to hospitalization by principal diagnosis group for CY 1994 is displayed in figures 5-30 and 5-31, respectively.
- Trends of Air Force Injury-Related Hospitalizations Over Time.
 - The rates of hospitalization by year and by top 10 principal diagnosis groups for CY 1980-1994 are displayed in figures 5-32 and 5-33, respectively.
 - The frequency, case rates, and NERs by principal diagnosis group for hospitalized men and women for CY 1994 are displayed in Table 5-18.
- Hospitalizations by External Causes of Injury.
 - The distribution of hospitalizations by external causes of injury for CY 1994 is displayed in Figure 5-34.
 - The rates of hospitalization coded by external cause of injury for CY 1980-1994 are displayed in Figure 5-35.
- The rates and NERs of hospitalizations for the top 10 external causes of injury for CY 1980-1994 are displayed in figures 5-36 and 5-37, respectively.
- The frequency, case rates, and NERs by external causes of injury for hospitalized men and women for CY 1994 are displayed in Table 5-19.

The Air Force Summary.

Table 5-15. Overall Summary of Air Force Hospitalization Data for Active Duty Personnel

Year	Total Air Force Population	Hospitalizations		Rates and Trends of Hospitalizations		Conclusion
		Total Personnel	n/1,000 Personnel/Day	n/1,000 Personnel/Year	Trend, % Change (CY 1980-1994)	
CY80-94	—	—	—	155 (CY80) —	100 (CY94) —	Down 35% —
CY94	427,790*	42,479	100	—	—	Overall hospitalization rates in the Air Force have declined over this 15-year period.

* Obtained from the Medical Information Systems Division, Directorate of Health Care Support, Office of The Surgeon General, U.S. Air Force, 1993.

Table 5-16. Summary of Air Force Hospitalization Distribution Data by Principal Diagnosis Group, CY 1994

Principal Diagnosis Groups	ICD-9 Codes	Distribution (%)		Conclusions
		Hospitalizations (n = 42,479)	Non-Effective Days (n = 163,309)	
Digestive System	520-579	22%	10%	Hospitalizations <ul style="list-style-type: none"> Digestive system disease is the leading cause of hospitalization in the Air Force.
Musculoskeletal System	710-739	14%	9%	<ul style="list-style-type: none"> When musculoskeletal system diseases and injury principal diagnosis groups are combined (injuries may be coded as musculoskeletal system diseases), they account for 22% of all hospitalizations.
Pregnancy	630-676	13%	10%	
Injury	800-999	8%	9%	
Genitourinary System	580-629	7%	4%	Non-Effective Days <ul style="list-style-type: none"> Mental disorders account for the greatest percentage of non-effective days.
Mental Disorders	290-319	6%	33%	<ul style="list-style-type: none"> Musculoskeletal system diseases and injury principal diagnosis groups combined account for 18% of the total non-effective days.
Respiratory System	460-519	6%	3%	
Circulatory System	390-459	3%	3%	
Ill-Defined Conditions	780-799	3%	—	
Nervous System	320-389	3%	—	
Neoplasms	140-239	3%	4%	
Other*	—	12%	15%	

* Includes groups less than 3% each.

Table 5-17. Summary of Air Force Hospitalization Data by External Cause of Injury, CY 1994

External Causes of Injury*	Distribution (%) of Hospitalizations (n=4,943)	Rate of Hospitalizations (per 1,000 personnel per year)	NERs† (per 100,000 personnel per day)	Conclusions
Athletics/Sports Injuries	23%	2.6	2.3	<ul style="list-style-type: none"> When looking only at nonmedical causes of injury, athletics/sports were the leading cause of injury hospitalization for the Air Force in CY 1994, and the second leading cause of non-effective days.
Complications of Medical/Surgical Procedures	22%	2.6	4.9	<ul style="list-style-type: none"> Complications of medical/surgical procedures were second as a percentage of hospitalizations, but were the leading cause in terms of the NER.
Motor Vehicle Accidents	10%	1.1	2.9	<ul style="list-style-type: none"> When looking only at nonmedical causes of injury, motor vehicle accidents were the second most common cause of injury hospitalization and the leading cause of non-effective days.
Falls/Jumps	8%	0.9	1.1	
Late Effects of Injury	5%	0.6	0.8	
Poisoning by Ingestion	3%	0.4	1.3	
Twists/Turns/Slips	3%	0.4	0.3	
Cut/Pierce by Objects	3%	0.4	0.5	
Guns/Explosives	2%	0.2	0.2	
Fighting	2%	0.2	0.2	
Other‡	19%	—	—	

* NATO STANAG codes.

† NER = total sick days per 100,000 personnel per day. This is a different calculation than that used by the Army.

‡ Includes Unknown/Unspecified Agents (8%), Codes Not Specified (3%), and all causes accounting for less than 1.5%.

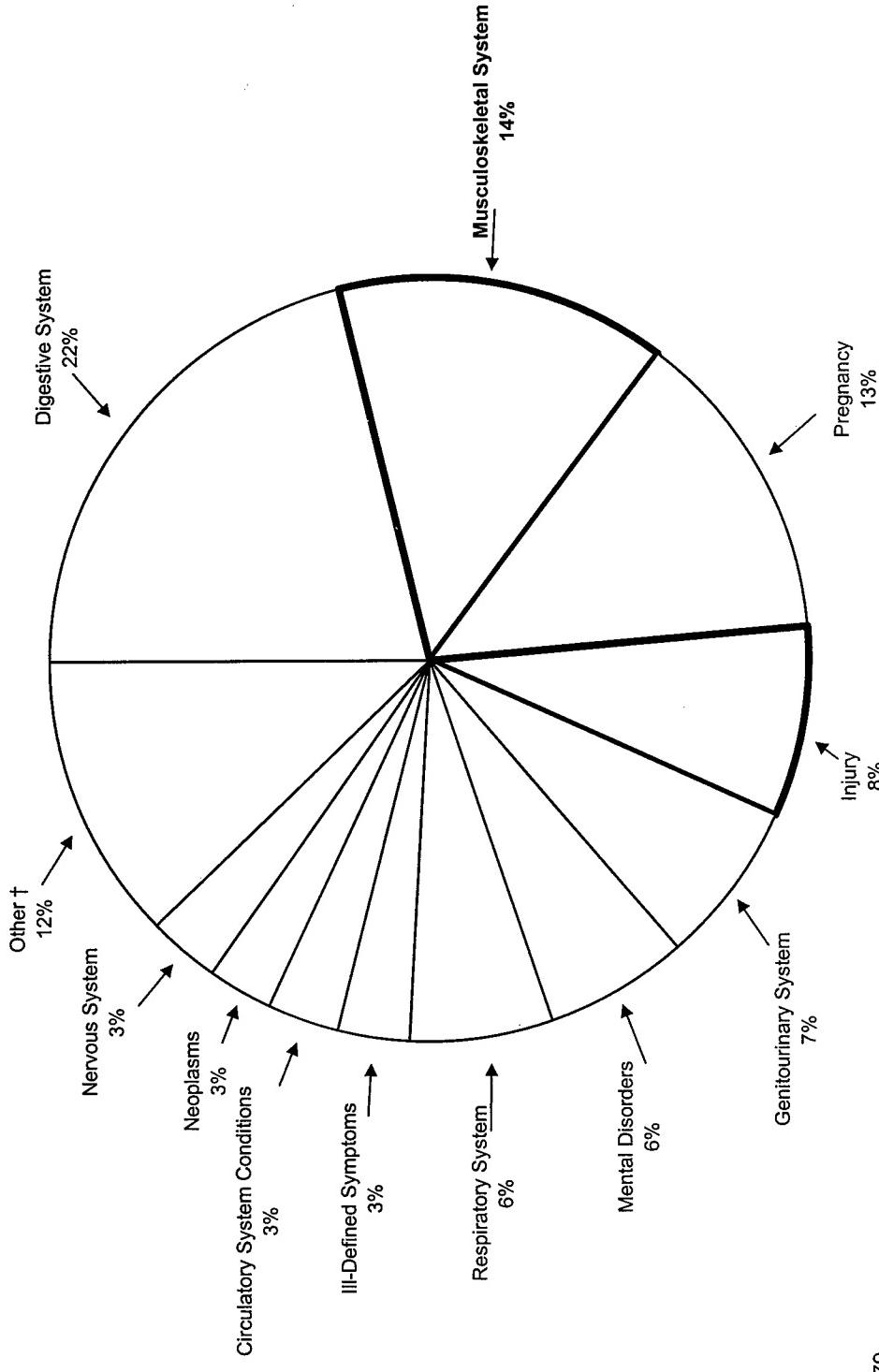
Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses.

Figure 5-30 illustrates the distribution of 42,479 hospitalizations by principal diagnosis group for active duty Air Force personnel for CY 1994. The top five contributors to hospitalization were:

- Digestive system (ICD-9 codes 520-579)—22%.
- Musculoskeletal system (ICD-9 codes 710-739)—14%.
- Pregnancy (ICD-9 codes 630-676)—13%.
- Injury (ICD-9 codes 800-999)—8%.
- Genitourinary system (ICD-9 codes 580-629)—7%.

When musculoskeletal system diseases, which are largely injury related, and injury diagnosis groups are combined, they account for 22% of all admissions. This combined group of injury-related hospitalizations is equal to digestive system disorders, the leading category of hospitalizations.

Air Force - Distribution (%) of Hospitalizations by Principal Diagnosis Group for Active Duty Personnel, CY 1994*



n = 42,479.

* Principal diagnosis groups from the *International Classification of Diseases*, 9th Edition.
† Includes Infectious & Parasitic (2%), Skin Diseases (2%), Congenital Anomalies (1%), Endocrine, Nutritional, & Metabolic (1%), and Other (6%).

Source: Inpatient database, Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

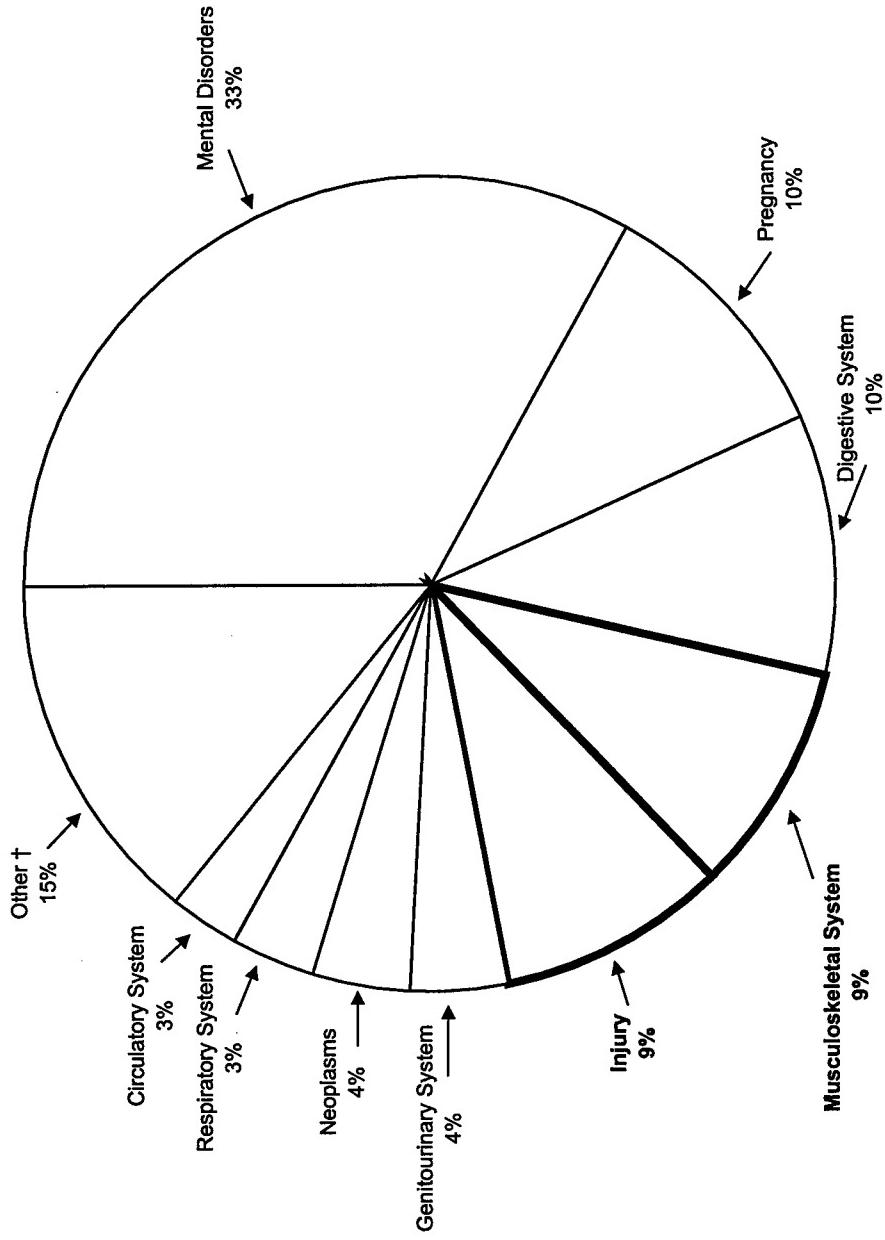
Figure 5-30

Figure 5-31 illustrates the distribution of non-effective days due to hospitalization by principal diagnosis group for active duty Air Force personnel for CY 1994. The approximate number of non-effective days for CY 1994 was 163,309 days, with the following top five contributors:

- Mental disorders (ICD-9 codes 290-319)—33%.
- Pregnancy (ICD-9 codes 630-676)—10%.
- Digestive system (ICD-9 codes 520-579)—10%.
- Musculoskeletal system (ICD-9 codes 710-739)—9%.
- Injury (ICD-9 codes 800-999)—9%.

Hospitalizations coded as musculoskeletal system diseases, are largely injury related when the musculoskeletal system and injury diagnosis groups are combined, they account for 18% of the total number of non-effective days, second behind mental disorders.

Air Force - Distribution (%) of Non-Effective Days Due to Hospitalization by Principal Diagnosis Group for Active Duty Personnel,* CY 1994



n (approximate number of non-effective days) = 163,309.

* Principal diagnosis groups from the International Classification of Diseases, 9th Edition.

† Includes Nervous System (2%), Infectious & Parasitic (2%), Ill-Defined Conditions (2%), Skin Diseases (1%), Endocrine, Nutritional, & Metabolic (1%), Congenital Anomalies (1%), and Other (6%).

Source: Inpatient database, Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Figure 5-31

Trends of Air Force Injury-Related Hospitalizations Over Time.

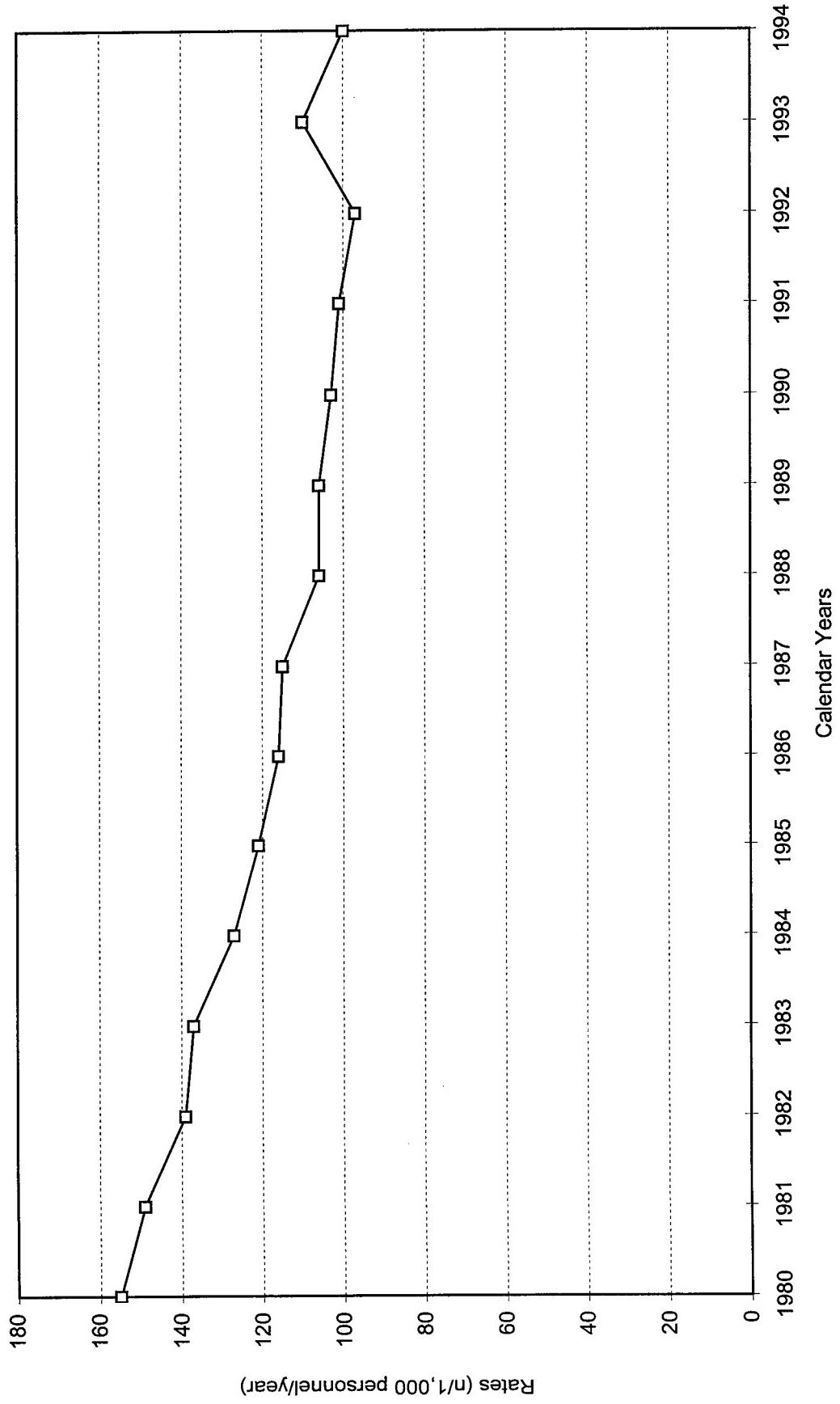
Figure 5-32 illustrates the rate of hospitalization by year for active duty Air Force personnel for CY 1980-1994. Hospitalization rates decreased 35% from 155 per 1,000 personnel per year in CY 1980 to 100 per 1,000 personnel per year in CY 1994.

Worksheet Data for Figure 5-32

Air Force - Rates of Hospitalization by Calendar Year*										
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
155	149	139	137	127	121	116	115	106	106	103
										101

* Rates per 1,000 personnel.

Air Force - Rates of Hospitalization by Year for Active Duty Personnel, CY 1980-1994



Source: Inpatient database (numerator) and military personnel extract (denominator), Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Atlas of Injuries in the U.S. Armed Forces

Figure 5-33 illustrates the rates of hospitalization for the top 10 principal diagnosis groups for active duty Air Force personnel for CY 1980-1994.

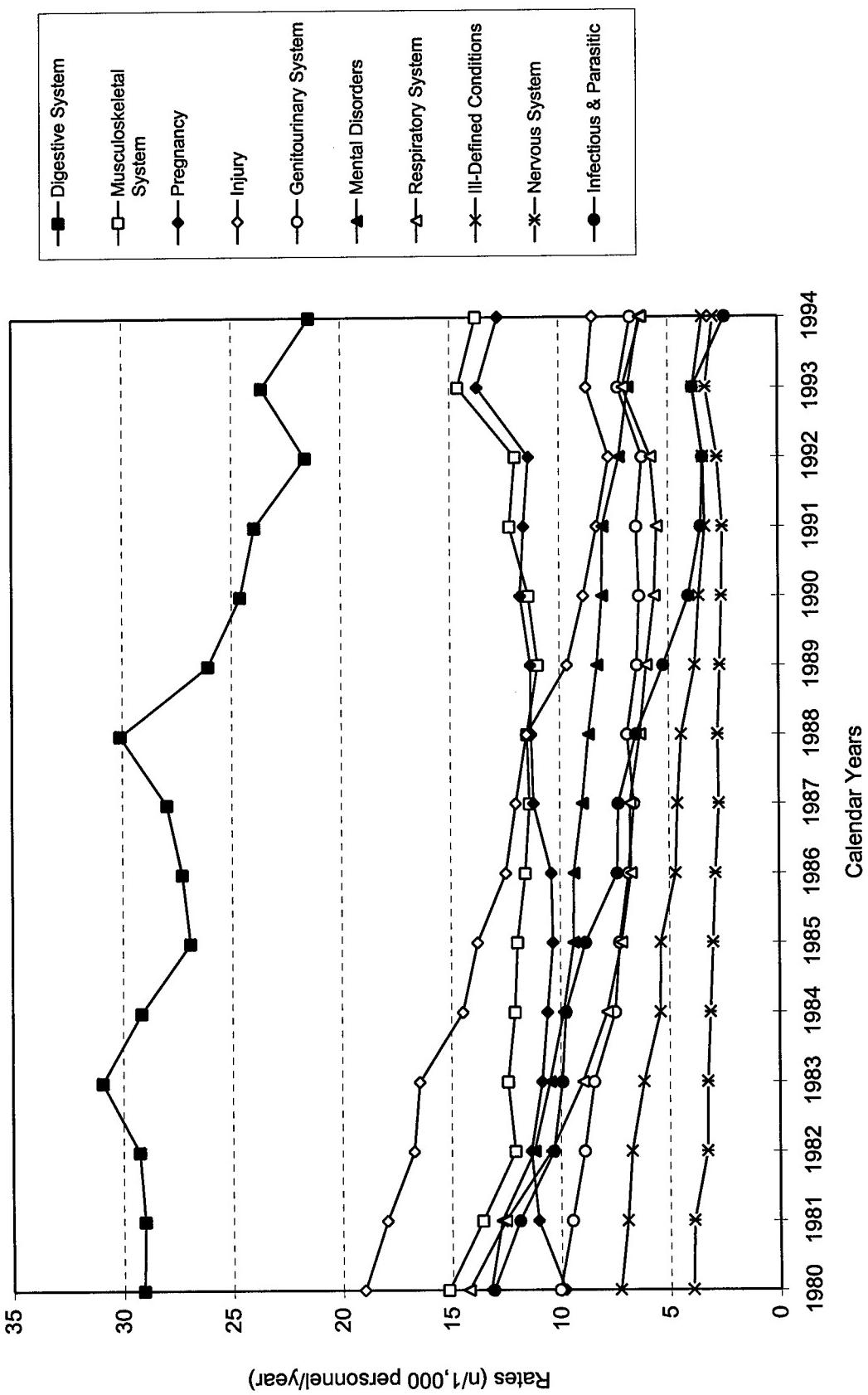
- Digestive system hospitalization rates decreased 30% from a high of 31 per 1,000 personnel in CY 1983 to a low of 21 per 1,000 personnel in CY 1994.
- Musculoskeletal system hospitalization rates, the second ranked contributor, have shown little change over the period with rates of about 11 or 12 per 1,000 personnel per year for most years.
- Injury hospitalization rates decreased 59% from a high of 19 per 1,000 personnel in CY 1980 to a low of 8 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-33

Principal Diagnosis Groups (Rank Based on 1994 Data)	ICD-9 Codes	Air Force - Rates of Hospitalization by Calendar Year*															
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	
Digestive System	520-579	29	29	29	31	29	27	27	28	30	26	25	24	22	24	21	
Musculoskeletal System	710-739	15	14	12	12	12	12	12	11	11	11	11	12	12	15	14	
Pregnancy	630-676	10	11	11	11	11	10	10	11	11	11	11	12	12	11	14	13
Injury	800-999	19	18	17	16	14	14	12	12	12	10	9	8	8	9	8	
Genitourinary System	580-629	10	9	9	8	7	7	7	7	7	6	6	6	6	7	7	
Mental Disorders	290-319	13	13	11	10	10	9	9	9	9	8	8	8	7	7	6	
Respiratory System	460-519	14	13	10	9	8	7	7	7	7	6	6	6	6	7	6	
Ill-Defined Conditions	780-799	7	7	6	5	5	5	5	4	4	4	4	3	3	4	3	
Nervous System	320-389	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	
Infectious & Parasitic	001-139	13	12	10	10	9	7	7	5	4	4	3	4	2			

* Rates per 1,000 personnel.

Air Force - Rates of Hospitalization for Top 10 Principal Diagnosis Groups for Active Duty Personnel, CY 1980-1994



Source: Inpatient database (numerator) and military personnel extract (denominator), Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Table 5-18 displays the frequency, case rates, and NERs by principal diagnosis group for hospitalized active duty Air Force men and women for CY 1994.

- The top 3 hospitalization rates for men in 1994 were:
 - Digestive system (ICD-9 codes 520-579)—20.16.
 - Musculoskeletal system diseases (ICD-9 codes 710-739)—13.22.
 - Injuries (ICD-9 codes 800-999)—8.61.
 - The top 3 hospitalization rates for women in 1994 were:
 - Pregnancy (ICD-9 codes 630-676)—82.64.
 - Digestive system conditions (ICD-9 codes 520-579)—28.42.
 - Genitourinary system conditions (ICD-9 codes 580-629)—25.30.
 - The top 3 NERs for men in 1994 were:
 - Mental disorders (ICD-9 codes 290-319)—33.44.
 - Digestive system conditions (ICD-9 codes 520-579)—10.31.
 - Injury (ICD-9 codes 800-999)—10.01.
 - The top 3 NERs for women in 1994 were:
 - Pregnancy (ICD-9 codes 630-676)—72.38.
 - Mental disorders (ICD-9 codes 290-319)—50.29.
 - Genitourinary system (ICD-9 codes 580-629)—15.53.
- Case rates for the musculoskeletal system were similar for men and women.
- Injury case rates were slightly higher for men as compared to women.
 - Though not in the top three case rates for men or women, mental disorders were one of the top three contributors to non-effective days for both men and women.

Table 5-18. Air Force - Frequency (n), Case Rates, and Non-Effective Rates by Principal Diagnosis Group for Hospitalized Active Duty Men and Women, CY 1994

Principal Diagnosis Groups	ICD-9 Codes	Men			Women			Total		
		n*	Case Rate†	NER‡	n	Case Rate	NER	n	Case Rate	NER
Digestive System	520-579	7,234	20.16	10.31	1,865	28.42	15.48	9,099	21.44	11.11
Musculoskeletal System	710-739	4,744	13.22	9.74	1,114	16.93	11.63	5,858	13.80	10.03
Pregnancy	630-676	0	0	5,423	82.64	72.38	5,423	12.79	11.19	
Injury	800-999	3,089	8.61	10.01	503	7.67	9.79	3,592	8.46	9.98
Genitourinary System	580-629	1,189	3.31	2.09	1,660	25.30	15.53	2,849	6.71	4.17
Mental Disorders	290-319	2,089	5.82	33.44	594	9.05	50.29	2,683	6.32	36.05
Respiratory System	460-519	2,056	5.73	3.44	591	9.01	5.15	2,647	6.24	3.71
Ill-Defined Conditions	780-799	1,080	3.01	2.15	375	5.71	4.29	1,455	3.43	2.43
Nervous System	320-389	872	2.43	2.15	374	5.70	5.11	1,246	2.94	2.61
Neoplasms	140-239	737	2.05	3.75	498	7.59	6.45	1,235	2.91	4.16
Circulatory System	390-459	993	2.77	3.45	113	1.72	1.60	1,106	2.61	3.16
Infectious & Parasitic	001-139	775	2.15	2.34	249	3.79	3.49	1,024	2.41	2.52
Skin & Breast	680-709	573	1.60	1.16	162	2.47	1.29	735	1.73	1.18
Endocrine, Nutritional, & Metabolic	240-279	223	0.62	0.71	151	2.30	1.61	374	0.88	0.85
Congenital Anomalies	740-759	227	0.63	0.54	92	1.40	1.08	319	0.75	0.63
Blood & Blood Forming Organs	280-289	79	0.22	0.27	33	0.50	0.51	112	0.26	0.31
Other	—	1,778	4.96	3.58	944	14.39	5.44	2,722	6.41	4.33
Total	—	27,738	77.29	89.13	14,741	224.59	211.12	42,479	100.09	108.42

* n = number of hospitalizations.

† Case Rate = number of individuals hospitalized per 1,000 personnel per year.

‡ NER = total sick days per 100,000 personnel per day.

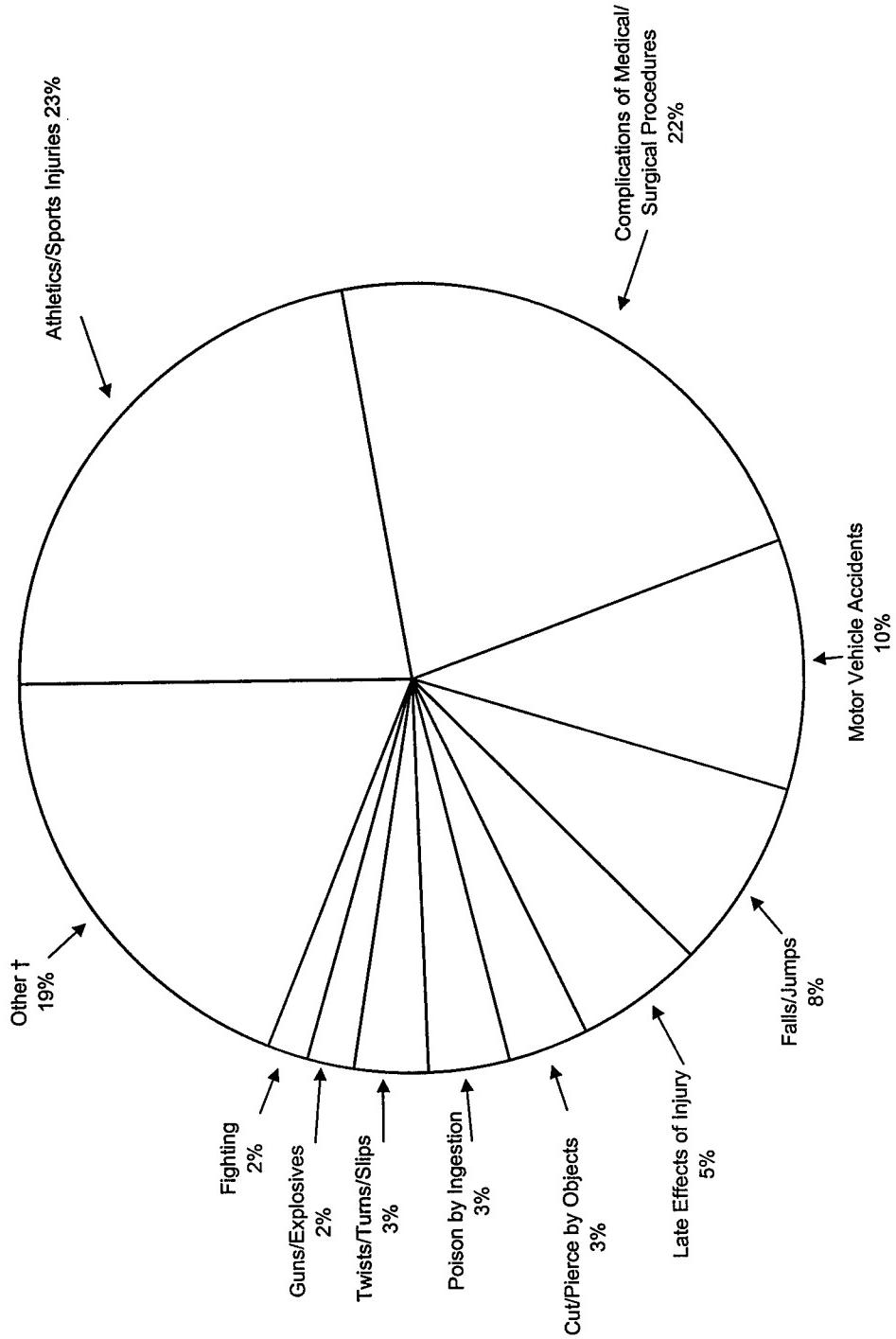
Source: Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force.

Hospitalizations by External Causes of Injury.

Figure 5-34 illustrates the distribution of hospitalizations by external causes of injury for active duty Air Force personnel for CY 1994. Of a total of 4,934 hospitalizations, the top five contributors were:

- Athletic and sports injuries—23%.
- Complications of medical or surgical procedures—22%.
- Motor vehicle accidents—10%.
- Falls and jumps—8%.
- Late effects of injuries—5%.

Air Force - Distribution (%) of Hospitalizations by External Causes of Injury* for Active Duty Personnel, CY 1994



n = 4,934.

* NATO Standard Agreement (STANAG) codes.

† Includes Unknown/Unspecified Agents (8%), Codes Not Specified (3%), and all causes accounting for less than 1.5%.

Source: Inpatient database , Medical Information Systems Division, Directorate of Health Care Support,
Office of the Surgeon General, U.S. Air Force, 1996.

Figure 5-34

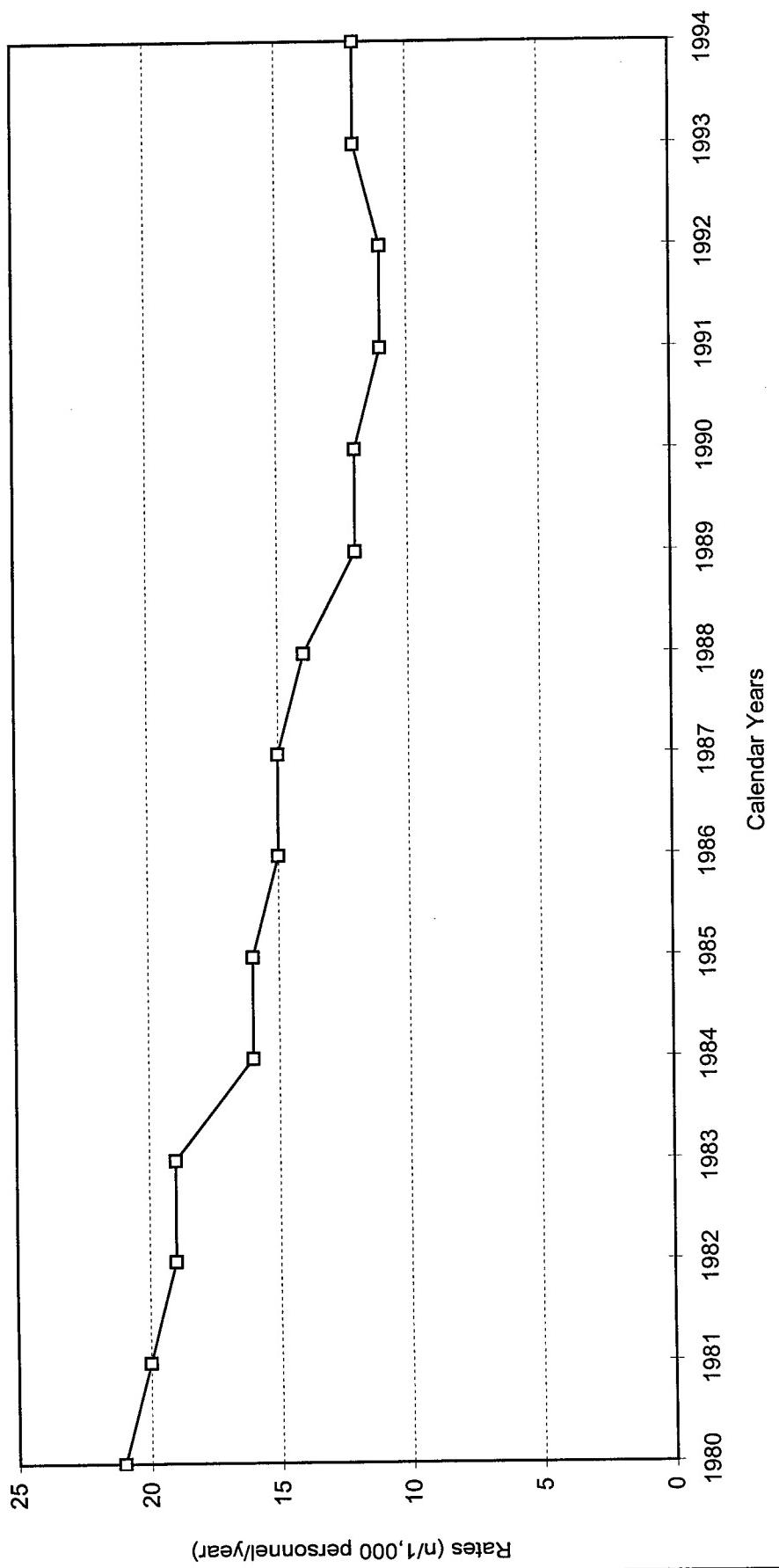
Figure 5-35 illustrates the rates of hospitalization coded by external cause of injury for active duty Air Force personnel for CY 1980-1994. The rates show a gradual decrease that essentially mirrors the trend of total hospitalizations seen in Figure 5-33. The overall rate decreased 43% from 21 per 1,000 personnel in CY 1980 to 12 per 1,000 personnel in CY 1994. These rates are higher than for the injury principal diagnosis group alone because injuries with an external cause code may fall under other principal diagnosis groups. For example, late, recurrent, or chronic effects of injuries are typically coded under the musculoskeletal system principal diagnosis group.

Worksheet Data for Figure 5-35

Air Force - Rates of Hospitalization by External Cause of Injury by Calendar Year*														
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
21	20	19	19	16	16	15	15	14	12	12	11	11	12	12

* Rates per 1,000 personnel.

Air Force - Rates of Hospitalization Coded by External Cause of Injury* for Active Duty Personnel, CY 1980-1994



* NATO Standard Agreement (STANAG) codes.

Source: Inpatient database (numerator) and military personnel extract (denominator), Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Figure 5-35

Figure 5-36 illustrates the rates of hospitalization for the top 10 external causes of injury for active duty Air Force personnel for CY 1980-1994.

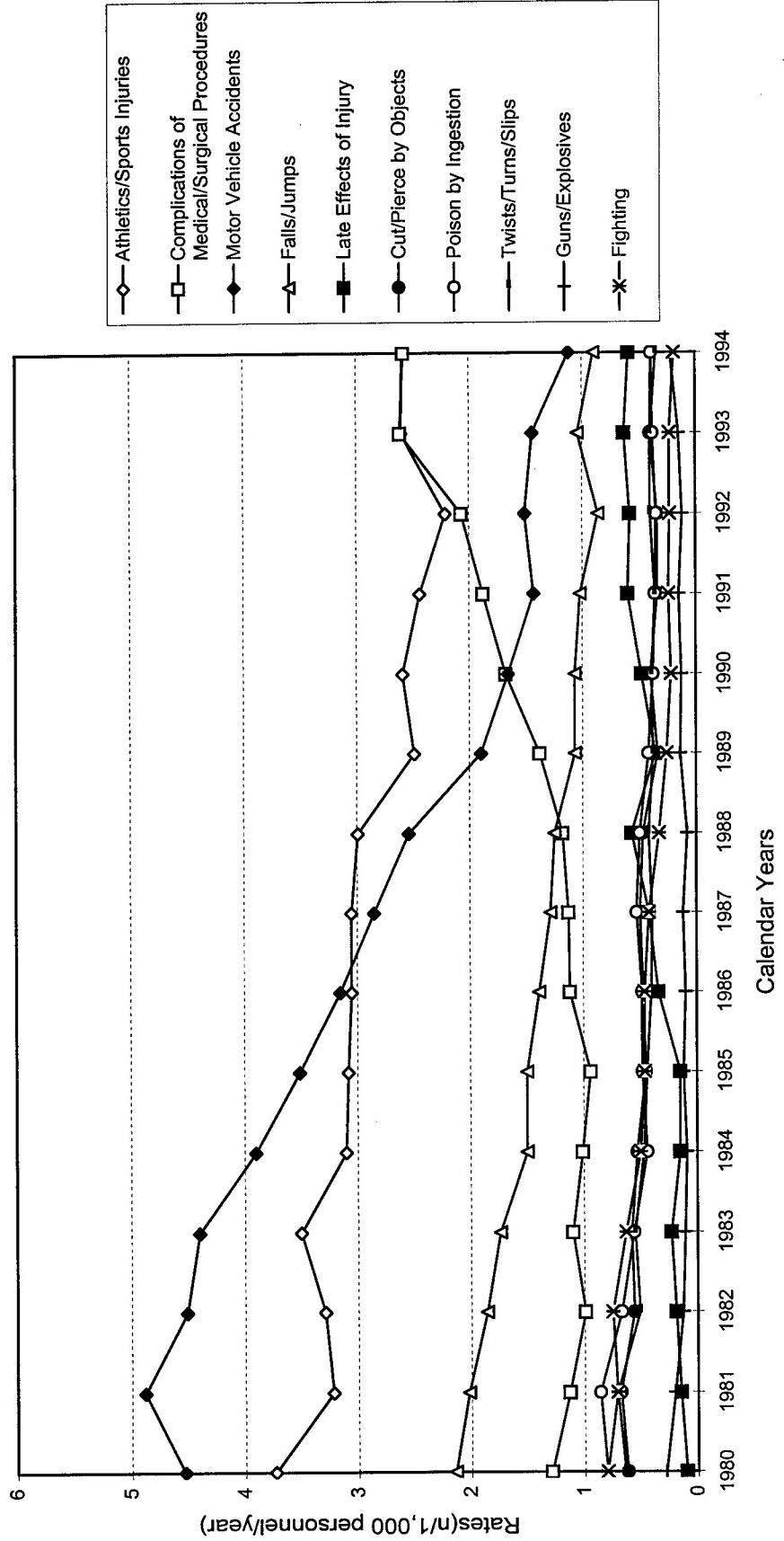
- Athletics and sports decreased 30% from 3.7 per 1,000 personnel for CY 1980 to 2.6 per 1,000 personnel for CY 1994.
- Complications of medical or surgical procedures increased 50% from 1.3 per 1,000 personnel in CY 1980 to 2.6 per 1,000 personnel in CY 1994.
- Motor vehicle accidents decreased 76% from 4.5 per 1,000 in CY 1980 to 1.1 per 1,000 personnel in CY 1994.
- Falls and jumps decreased 57% from 2.1 per 1,000 personnel in CY 1980 to 0.9 per 1,000 personnel in CY 1994.

Worksheet Data for Figure 5-36

Top 10 External Causes of Injury (Rank Based on 1994 Data)	Air Force - Rates of Hospitalization by External Cause of Injury by Calendar Year*														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Athletics/Sports	3.7	3.2	3.3	3.5	3.1	3.1	3.1	3.1	3.0	2.5	2.6	2.4	2.2	2.6	2.6
Compl. of Medical/Surgical	1.3	1.1	1.0	1.1	1.0	0.9	1.1	1.1	1.2	1.4	1.7	1.9	2.1	2.6	2.6
Motor Vehicle Accidents	4.5	4.9	4.5	4.4	3.9	3.5	3.2	2.9	2.5	1.9	1.7	1.4	1.5	1.4	1.1
Falls/Jumps	2.1	2.0	1.9	1.7	1.5	1.5	1.4	1.3	1.3	1.1	1.1	1.0	0.9	1.0	0.9
Late Effects of Injury	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4	0.6	0.4	0.5	0.6	0.6	0.6	0.6
Cut/Pierce by Objects	0.6	0.7	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.3	0.4	0.3	0.3	0.4	0.4
Poisoning by Ingestion	0.8	0.9	0.7	0.6	0.4	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.7	0.4	0.4
Twists/Turns/Slips	0.6	0.7	0.5	0.6	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.7	0.4	0.4	0.4
Guns/Explosives	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2
Fighting	0.8	0.7	0.8	0.6	0.5	0.5	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2

* Rates per 1,000 personnel.

Air Force - Rates of Hospitalization for the Top 10 External Causes of Injury* for Active Duty Personnel, CY 1980-1994



* NATO Standard Agreement (STANAG) codes.

Source: Inpatient database (numerator) and military personnel extract (denominator), Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Atlas of Injuries in the U.S. Armed Forces

Figure 5-36

Figure 5-37 illustrates the NERs for hospitalizations for the top 10 external causes of injury for active duty Air Force personnel for CY 1980-1994.

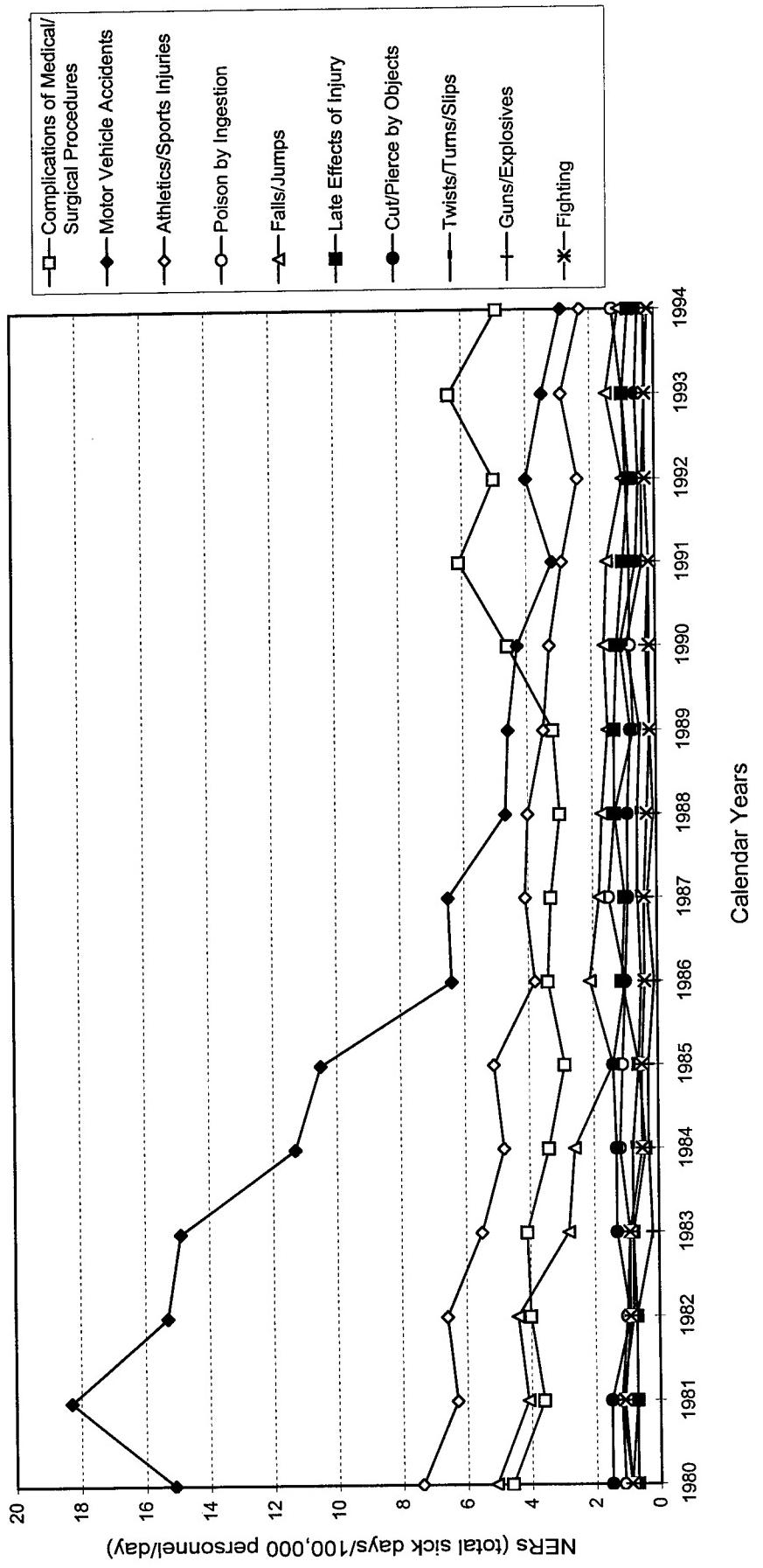
- Motor vehicle accident NERs decreased 84% from a high of 18.3 per 100,000 personnel per day in CY 1981 to 2.9 per 100,000 personnel per day in CY 1994.
- Athletics/sports NERs decreased 69% from 7.4 per 100,000 personnel per day in CY 1980 to 2.3 per 100,000 personnel per day in CY 1994.
- Falls and jumps decreased 78% from 5.1 per 100,000 personnel per day in CY 1980 to 1.1 per 100,000 personnel per day in CY 1994.

Worksheet Data for Figure 5-37

Top 10 External Causes (Rank Based on 1994 Data)	Air Force - Non-Effective Rates* for Hospitalizations Due to Injuries by Calendar Year														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Motor Vehicle Accidents	15.1	18.3	15.3	14.9	11.3	10.5	6.4	6.5	4.7	4.6	4.3	3.2	4.0	3.5	2.9
Athletics/Sports	7.4	6.3	6.6	5.5	4.8	5.1	3.8	4.1	4.0	3.5	3.3	2.9	2.4	2.9	2.3
Falls/Jumps	5.1	4.1	4.4	2.8	2.6	1.4	2.1	1.8	1.7	1.5	1.6	1.5	1.0	1.5	1.1
Comp. of Medical/Surgical	4.6	3.6	4.0	4.1	3.4	2.9	3.4	3.3	3.0	3.2	4.6	6.1	5.0	6.4	4.9
Cut/Pierce by Object	1.5	1.5	0.9	1.3	1.3	1.4	1.0	0.9	0.9	0.8	1.1	0.6	0.5	0.6	0.5
Poisoning by Ingestion	1.1	1.2	1.0	0.9	1.2	1.1	1.0	1.5	1.3	0.7	0.8	0.8	0.9	1.0	1.3
Twists/Turns/Slips	0.9	1.2	0.8	0.8	0.8	0.6	0.5	0.6	0.6	0.5	0.9	0.4	0.4	0.3	0.3
Guns/Explosives	0.9	0.7	0.7	0.2	0.3	0.3	0.1	0.3	0.1	0.2	0.3	0.2	0.3	0.3	0.2
Fighting	0.9	1.1	0.9	0.9	0.5	0.5	0.4	0.4	0.3	0.2	0.2	0.2	0.3	0.3	0.2
Late Effects of Injury	0.7	0.7	0.7	0.8	0.4	0.6	1.1	1.0	1.3	1.3	1.2	1.0	0.8	1.0	0.8

* Rates are days lost per 100,000 personnel per day.

Air Force - Non-Effective Rates for Hospitalizations for the Top 10 External Causes of Injury* for Active Duty Personnel, CY 1980-1994



* NATO Standard Agreement (STANAG) codes.

Source: Inpatient database (numerator) and military personnel extract (denominator), Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force, 1996.

Figure 5-37

Table 5-19 displays the frequency, case rates, and NERs by external causes of injury for hospitalized active duty Air Force men and women for CY 1994.

- The top three hospitalization rates by external cause of injury for men were:
 - Athletics and sports injuries—2.8.
 - Complications of medical or surgical procedures—2.1.
 - Motor vehicle accidents—1.2.
- The top three hospitalization rates by external cause of injury for women were:
 - Complications of medical or surgical procedures—5.2.
 - Athletics and sports injuries—1.3.
 - Motor vehicle accidents—1.1.
- The top three NERs by external cause of injury for men were:
 - Complications of medical or surgical procedures—4.4.
 - Motor vehicle accidents—3.0.
 - Athletics and sports injuries—2.5.
- The top three NERs by external cause of injury for women were:
 - Complications of medical or surgical procedures—7.9.
 - Poisoning by ingestion—3.0.
 - Motor vehicle accidents—2.7.
- Motor vehicle accident rates were similar for men and women.
 - Athletics and sport injuries case rates were greater for men as compared to women.
 - Motor vehicle accidents and complications of medical or surgical procedures were one of the top three contributors to non-effective days for both men and women.

Table 5-19. Air Force - Frequency (n), Case Rates, and Non-Effective Rates by External Causes of Injury for Hospitalized Active Duty Men and Women, CY 1994

External Causes of Injury	Men			Women			Total		
	n*	Case Rate†	NER‡	n	Case Rate	NER	n	Case Rate	NER
Athletic and Sports Injuries	1,015	2.8	2.5	83	1.3	1.1	1,098	2.6	2.3
Complications of Medical/Surgical Procedures	752	2.1	4.4	342	5.2	7.9	1,094	2.6	4.9
Motor Vehicle Accidents	440	1.2	3.0	74	1.1	2.7	514	1.2	2.9
Falls or Jumps	315	0.9	1.0	68	1.0	1.2	383	0.9	1.1
Late Effects of Injury	203	0.6	0.7	48	0.7	1.4	251	0.6	0.8
Cutting or Piercing Objects	145	0.4	0.5	22	0.3	0.3	167	0.4	0.5
Poisoning by Ingestion	99	0.3	1.0	66	1.0	3.0	165	0.4	1.3
Twisting, Turning, Slipping	130	0.4	0.3	21	0.3	0.3	151	0.4	0.3
Guns, Explosives, and Related Agents	84	0.2	0.2	10	0.2	0.3	94	0.2	0.2
Fighting	66	0.2	0.2	13	0.2	0.1	79	0.2	0.2
Other Specified Environmental Factors	45	0.1	0.1	18	0.3	0.2	63	0.2	0.1
Machinery, Tools, and Other Agents	57	0.2	0.2	2	0	0	59	0.1	0.1
Water and Land Transport	45	0.1	0.2	10	0.2	0.1	55	0.2	0.1
Lifting, Pushing, Pulling	34	0.1	0.1	7	0.1	0.1	41	0.1	0.1

Table 5-19.—Continued

External Causes of Injury	Men			Women			Total		
	n*	Case Rate†	NER‡	n*	Case Rate†	NER‡	n*	Case Rate†	NER‡
Sting or Bite	31	0.1	0.1	3	0.1	0	34	0.1	0.1
Military Air Transport Accidents	31	0.1	0.1	1	0	0	32	0.1	0.1
Fire, Hot, Corrosive	20	0.1	0.1	6	0.1	0.2	26	0.1	0.1
Poison by Inhalation	21	0.1	0	4	0.1	0	25	0.1	0
Excessive Heat	12	0	0	7	0.1	0.1	19	0	0
Advance Syst/Skin Reaction	9	0	0	4	0.1	0	13	0	0
Complications of Prophylactic Inoculations	8	0	0	4	0.1	0	12	0	0
Conventional Weapons Injury	11	0	0	0	0	0	11	0	0
Hanging, Suffocation	8	0	0	0	0	0	8	0	0
Marching or Drilling	5	0	0	0	0	0	5	0	0
Excessive Cold	3	0	0	2	0	0	5	0	0
Drowning or Submersion	2	0	0	0	0	0	2	0	0
Codes Not Specified	105	0.3	0.3	7	0.1	0.1	113	0.3	0.2
Unknown or Unspecified Agents	364	1.0	1.2	51	0.8	1.2	415	1.0	1.2
Totals	4,040	11.3	16.1	867	9.4	20.1	4,907	11.5	16.5

* Frequency = number of hospitalizations.

† Case Rate = number of persons hospitalized per 1,000 personnel per year.

‡ NER = total sick days per 100,000 personnel per day.

Source: Medical Information Systems Division, Directorate of Health Care Support, Office of the Surgeon General, U.S. Air Force.

5-10. Comparison of All Services

The military hospitalization data for each service, presented in paragraphs 5-6 through 5-9, are presented from three perspectives:

- Data reporting among the services is not compatible. The Army and Air Force group hospitalization codes by principal diagnosis. The Navy and Marine Corps group hospitalization codes by major diagnostic categories. Table 5-20 displays how the distribution of hospitalizations from the two reporting systems cannot be compared.
- Using the Defense Medical Epidemiology Database (DMED) for Navy and Marine Corps data, each service's distribution of hospitalizations by ICD-9 based Principal Diagnosis Group for 1994 is compared in Table 5-21.
- Each service's unadjusted hospitalization rates for 1989-1994 are compared in Table 5-22.

Table 5-20. Distribution of Hospitalizations for Active Duty Personnel, 1994—An Illustration of the Differences in Hospitalization Coding Schemes Among Services

PDG* or MDC†	ICD-9	MDC	Distribution (%) of Top 10 Hospitalizations For Each Service						Conclusions		
			Codes	Army (CY94)* (n = 84,086)	Navy (FY94)† (n = 32,021)	Marine Corps (FY94)† (n = 10,992)	Air Force (CY94)* (n = 42,479)	%	Rank	%	Rank
Musculoskeletal System	710-739	8	18%	1	22%	1	28%	1	14%	2	Data Reporting
Digestive System	520-579	6	12%	2	12%	3	12%	2	22%	1	At the outset of data collection, the services used non-uniform reporting methods that resulted in noncomparable data.
Injury	800-999	21	10%	3	2%‡	—	3%‡	—	8%	4	The Army and Air Force grouped hospitalization codes by principal diagnosis groups.
Pregnancy	630-676	14	9%	4	13%	2	5%	7	13%	3	The Navy and Marine Corps grouped hospitalization codes by major diagnostic categories.
Respiratory System	460-519	4	9%	5	—	—	4%	8	6%	7	To illustrate data comparability among services, CY94 data were requested from DMED—a resource not available at the outset of data collection efforts. See Table 5-21.
Mental Disorders	290-319	19	8%	6	8%	4	7%	5	6%	6	Musculoskeletal System
Genitourinary System	580-629	—	5%	7	—	—	—	—	7%	5	Most injuries for the Navy and Marine Corps are in the musculoskeletal system category.
Infectious & Parasitic	001-139	—	5%	8	—	—	—	—	—	—	V Codes§
	V01-Y82	—	4%	9	—	—	—	—	—	—	III-Defined Conditions
	780-799	—	4%	10	—	—	—	—	3%	8	Neoplasms
	140-239	17	—	—	—	—	—	—	3%	—	Skin & Breast
	680-709	9	—	—	5%	5	6%	6	—	—	Circulatory System
	390-459	5	—	—	4%	7	—	—	3%	10	Nervous System
	320-389	1	—	—	3%	8	3%	10	3%	9	Ear, Nose, Mouth, & Throat
	—	3	—	—	8%	4	7%	4	—	—	Alcohol & Drugs
	—	20	—	—	4%	6	9%	3	—	—	Male Reproductive System
	—	12	—	—	—	—	3%	9	—	—	Female Reproductive System
	—	13	—	—	4%	9	—	—	—	—	Other (groups less than 3% each)
	—	—	16%	—	17%	—	16%	—	12%	—	

* Army and Air Force hospitalizations by principal diagnosis group. † Navy and Marine Corps hospitalizations by major diagnostic categories.

‡ Not in top 10, but added for completion of injury picture.

§ Circumstances recorded as diagnoses or problems, but not classified as a disease, injury, or E code.

Table 5-21. Distribution of Hospitalizations by ICD-9 Based Principal Diagnosis Group for Active Duty Personnel, 1994—Comparing the Services Using Standardized Data

PDG	ICD-9 Codes	Distribution (%) of Top 10 Hospitalizations For Each Service						Conclusions
		Army (CY94) (n = 84,086)	Navy (CY94)* (n = 38,626)	%	Rank	%	Rank	
Musculoskeletal System	710-739	18%	1	17%	1	21%	1	14% 2
Digestive System	520-579	12%	2	12%	3	11%	4	22% 1
Injury	800-999	10%	3	9%	5	14%	3	8% 4
Pregnancy	630-676	9%	4	12%	4	5%	6	13% 3
Respiratory System	460-519	9%	5	7%	6	8%	5	6% 7
Mental Disorders	290-319	8%	6	12%	2	15%	2	6% 6
Genitourinary System	580-629	5%	7	6%	7	5%	7	7% 5
Infectious & Parasitic	001-139	5%	8	—	—	—	—	— —
V Codes†	V01-V82	4%	9	5%	8	4%	8	— —
Ill-Defined Conditions	780-799	4%	10	4%	9	3%	10	3% 8
Skin & Breast	680-709	—	—	—	—	—	—	— —
Circulatory System	390-459	—	—	—	—	3%	9	3% 10
Nervous System	320-389	—	—	4%	10	—	—	3% 9
Neoplasms	140-239	—	—	—	—	—	—	3% —
Other (PDGs (3% each))	Endocrine, Nutritional, & Metabolic; Blood & Blood Forming Organs; Congenital Anomalies; Perinatal Period Conditions	240-279 280-289 740-759 760-779	16%	—	13%	—	12%	— —

* To illustrate data comparability among the services, CY94 data were obtained from DMED—a resource not available at the outset of data collection efforts.

† Circumstances recorded as diagnoses or problems, but not classified as a disease, injury, or E code.

- Musculoskeletal System**
 - Musculoskeletal system diseases, which are largely injury-related conditions, are the leading cause of hospitalization for the Army, Navy, and Marine Corps, but are the second leading cause of hospitalization for the Air Force.
- Injury**
 - The injury category was the third through the fifth highest ranking cause of hospitalization across the services.
- Musculoskeletal System and Injury**
 - The combined musculoskeletal system and injury categories range from 22% of all hospitalizations for the Air Force to 35% of all hospitalizations for the Marine Corps.
- Digestive System**
 - Digestive system diseases were the leading cause of hospitalization for the Air Force (22%) and second, third, or fourth for the Army (12%), Navy (12%), and Marine Corps (11%).
- Mental Disorder**
 - Hospitalizations due to mental disorders range from 6% for the Air Force to 15% for the Marine Corps.

Table 5-22. Unadjusted Rates of Hospitalization for Active Duty Personnel, 1989-1994—A Comparison of All Services

Years	Rates Per 1,000 Personnel/Year			Conclusions
	Army (CY)	Navy (FY)	Marine Corps (FY)	
1989	151	95	83	106
1990	145	93	83	103
1991	142	86	77	101
1992	143	83	79	97
1993	140	77	74	110
1994	153	71	61	100

From 1989 to 1994, the hospitalization rates for the Navy and Marine Corps declined 27% and 24%, respectively, while the rates for the Army and Air Force remained relatively stable.

Supplement A. Army - Operations Desert Shield and Storm, Injury Hospitalizations

With the increased number of military deployments in the post-Cold War era, sound epidemiological data are essential for understanding the health of military personnel during such operations. The Operations Desert Shield and Storm hospitalization data from southwest Asia for 1 August 1990 - 31 July 1991 are presented in three parts:

- Magnitude of the Injury Problem Relative to Other Causes of Hospitalization.
 - The distribution of selected hospitalization diagnoses by principal diagnosis group is displayed in Figure 5A-1.
 - The distribution of leading nonbattle injury hospitalizations is displayed in Figure 5A-2.
 - The distribution of sports and athletic injury diagnoses for hospitalizations is displayed in Figure 5A-3.
- Trends of Operations Desert Shield and Storm Nonbattle Injury Hospitalizations Over Time.
 - The rates of nonbattle injury hospitalization by month are displayed in Figure 5A-4.
 - Hospitalizations by Causes of Injury.
 - The leading causes of injury hospitalizations are displayed in Table 5A-1.

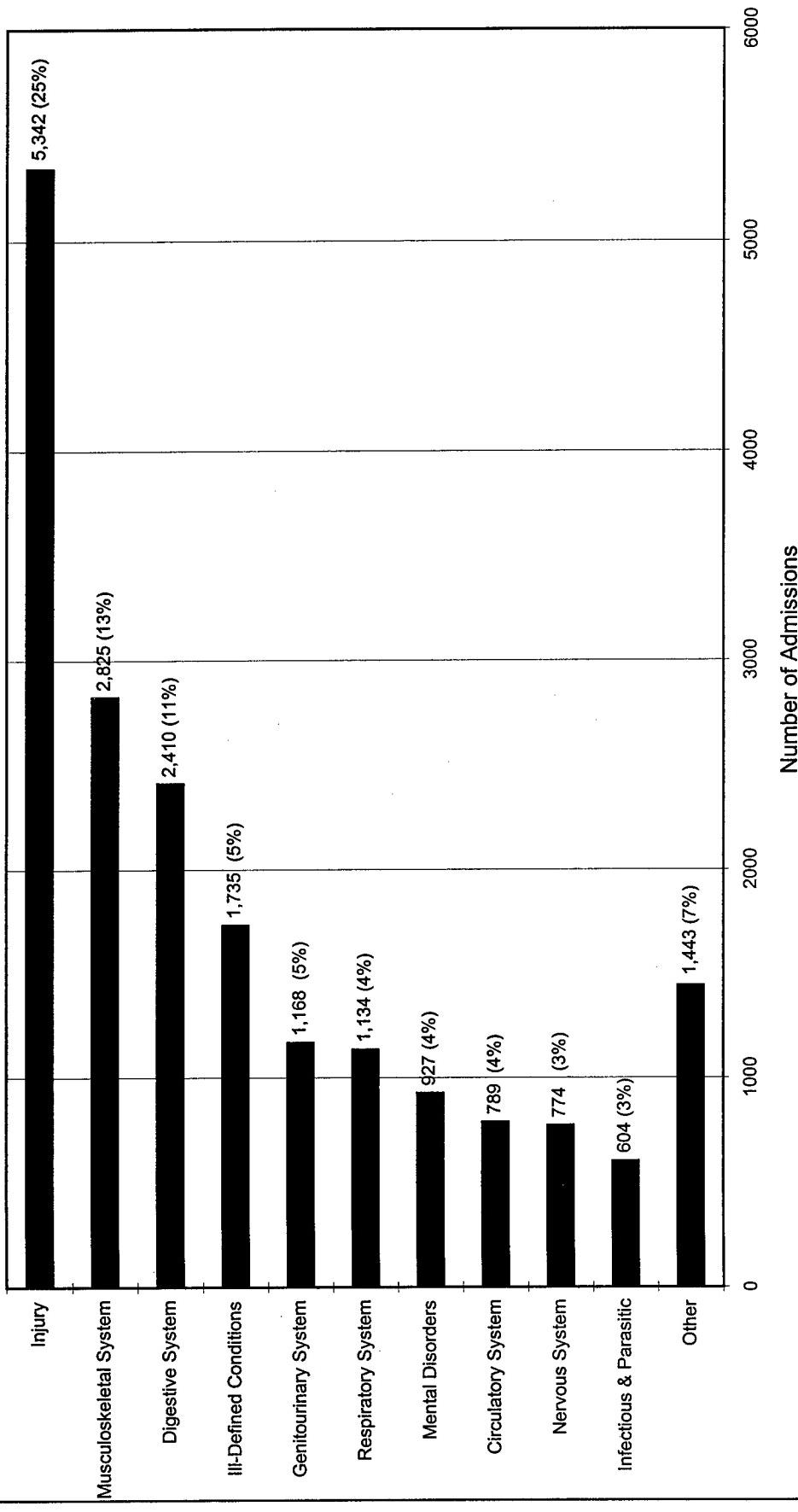
Magnitude of the Injury Problem Relative to Other Causes of Hospitalization.

Figure 5A-1 illustrates selected nonbattle hospitalization diagnoses by principal diagnosis group during Operations Desert Shield and Storm, 1 August 1990 - 31 July 1991. A total of 21,655 personnel were admitted to Army hospitals during Operations Desert Shield and Storm. The top five diagnoses were:

- Acute nonbattle injuries (ICD-9 codes 800-999)—25% (5,342).
- Musculoskeletal system (ICD-9 codes 710-739)—13% (2,825).
- Digestive system (ICD-9 codes 5200-579)—11% (2,410).
- Ill-defined conditions (ICD-9 codes 7890-799)—8% (1,735).
- Genitourinary system (ICD-9 codes 580-629)—5% (1,168).

There were only 956 battle-related admissions, less than 5% of all in-theater hospitalizations.

Army - Operations Desert Shield and Storm, Top 10 Nonbattle Hospitalization Diagnoses by Principal Diagnosis Group, 1 August 1990 - 31 July 1991



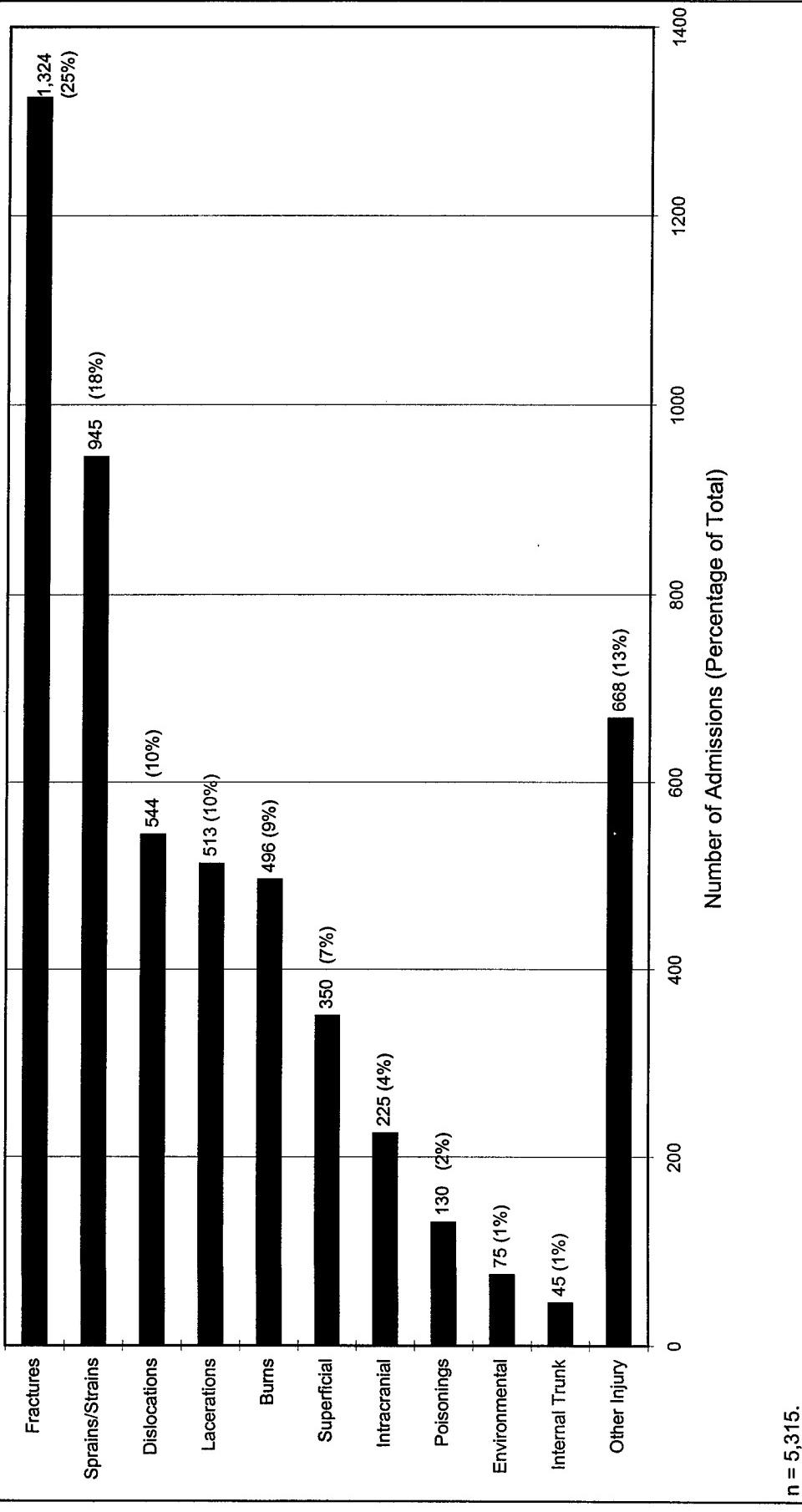
Source: Adapted from the Armed Forces Epidemiological Board, *Injuries in the Military: A Hidden Epidemic*, 1996.

Figure 5A-1

Figure 5A-2 illustrates the leading nonbattle injury diagnoses resulting in hospitalizations during Operations Desert Shield and Storm, 1 August 1990 - 31 July 1991. A total of 5,315 personnel were admitted to Army hospitals for nonbattle injuries. The top five causes of hospitalization were:

- Fractures—25% (1,324).
- Sprains/strains—18% (945).
- Dislocations—10% (544).
- Lacerations—10% (513).
- Burns—9% (496).

Army - Operations Desert Shield and Storm, Leading Nonbattle Injury Hospitalizations, 1 August 1990 - 31 July 1991



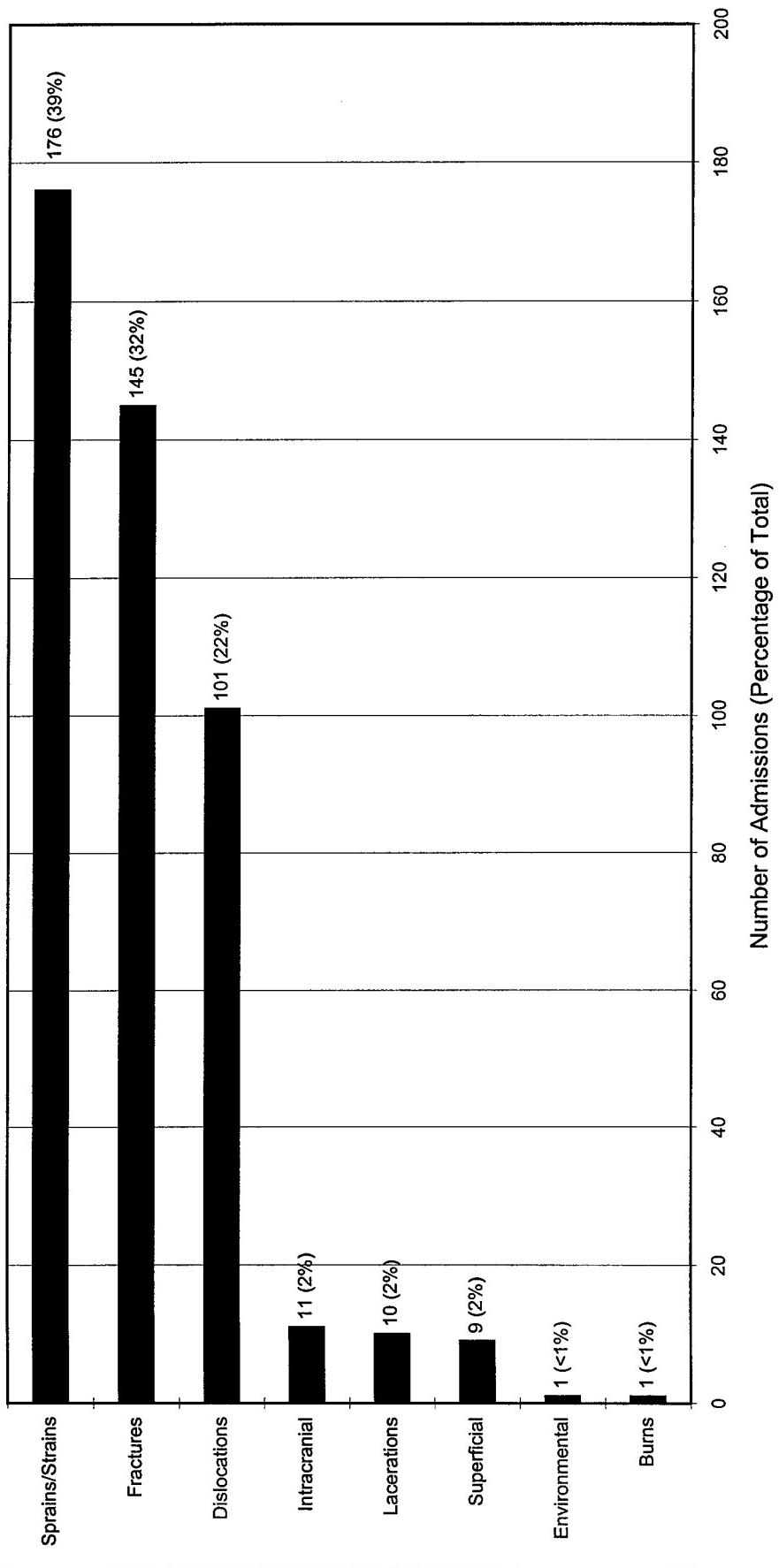
Source: Armed Forces Epidemiological Board, *Injuries in the Military: A Hidden Epidemic*, 1996.

Figure 5A-2

Figure 5A-3 illustrates the hospitalizations for sports and athletic injuries during Operations Desert Shield and Storm, 1 August 1990 - 31 July 1991. A total of 454 personnel were admitted to Army hospitals for sports and athletic injuries. The top five causes of hospitalization were:

- Sprains/strains—39% (176).
- Fractures—32% (145).
- Dislocations—22% (101).
- Intracranial—2% (11).
- Lacerations—2% (10).

Army - Operations Desert Shield and Storm, Hospitalizations for Sports and Athletic Injuries, 1 August 1990 - 31 July 1991



Source: Armed Forces Epidemiological Board, *Injuries in the Military: A Hidden Epidemic*, 1996.

Figure 5A-3

Trends of Operations Desert Shield and Storm Nonbattle Injury Hospitalizations Over Time.

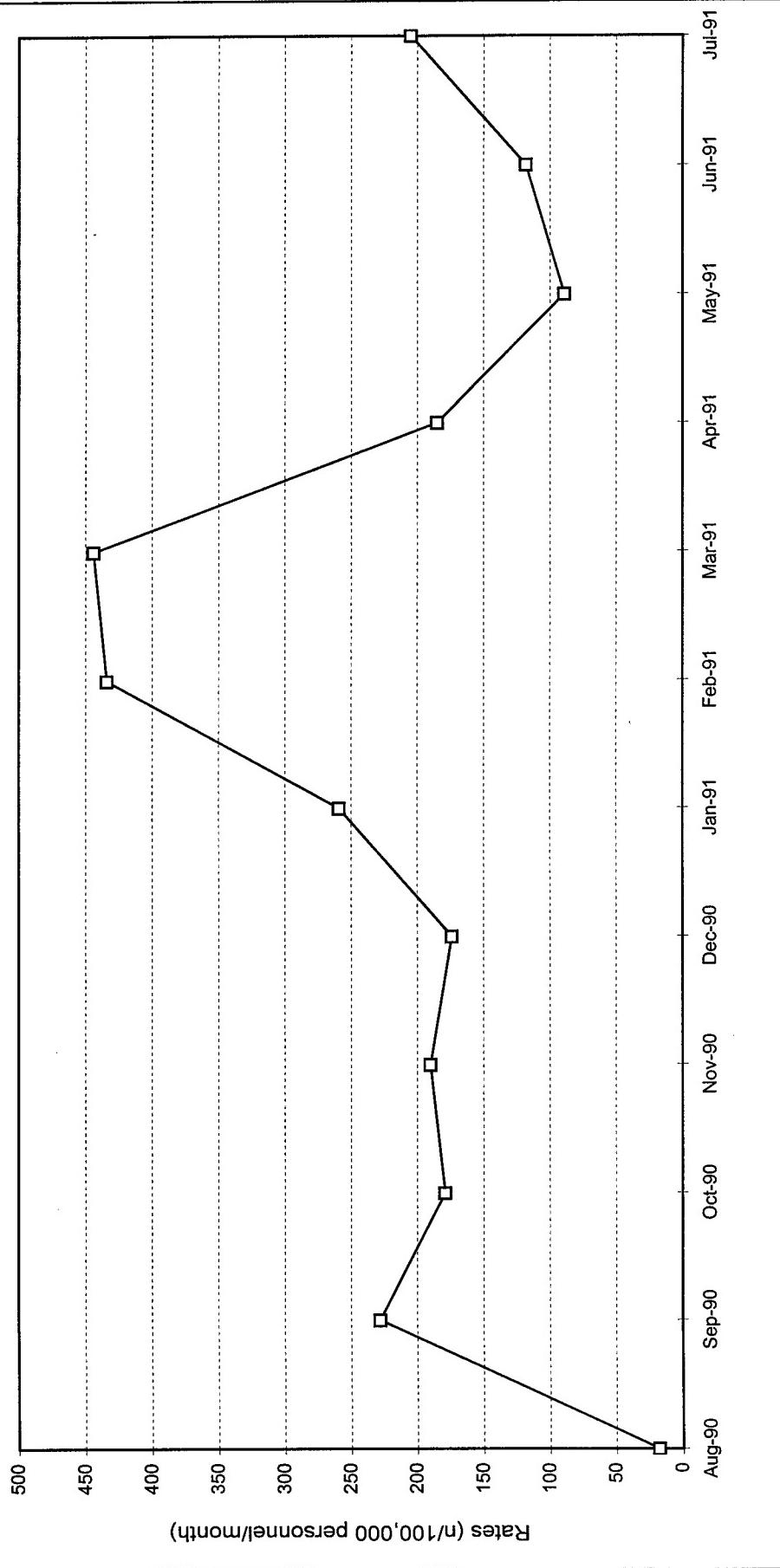
Figure 5A-4 illustrates the rate of nonbattle injury hospitalizations by month during Operations Desert Shield and Storm, 1 August 1990 - 31 July 1991. The highest rates of admissions occurred in February and March 1991 as a result of massive mobilization of forces and the intense and quick ground combat operations.

Worksheet Data for Figure 5A-4

Army - Rates of Nonbattle Injury Hospitalizations*							
	Aug-90	Sep-90	Oct-90	Nov-90	Dec-90	Jan-91	Feb-91
18	228	179	190	174	259	434	444
							185

* Rates per 100,000 personnel per month.

Army - Operations Desert Shield and Storm, Rates of Nonbattle Injury Hospitalization by Month, 1 August 1990 - 31 July 1991



Source: Armed Forces Epidemiological Board, *Injuries in the Military: A Hidden Epidemic*, 1996.

Figure 5A-4

Hospitalizations by Causes of Injury.

Table 5A-1 illustrates the six leading causes of injury hospitalizations during Operations Desert Shield and Storm, 1 August 1990-31 July 1991.

Table 5A-1. Army - Leading Causes of Injury Hospitalizations During Operations Desert Shield and Storm, 1 August 1990 - 31 July 1991

Causes of Injury (Selected STANAG Codes)*	Number	% of Injuries with Cause Code†	Rate‡
Motor Vehicle Accidents	566	19%	4.0
Falls	559	19%	4.0
Sports and Athletics	512	18%	3.6
Machinery and Tools	398	4%	2.8
Other Land Transport	126	4%	0.9
Weapons	113	4%	0.8

* The U.S. military services use standard NATO cause codes (STANAG codes) rather than ICD-9 E-codes.

† There were a total of 5,342 admissions for acute nonbattle injuries. Only about 50% of these (2,664) received an ICD-9 E-code designating the specific cause of injury.

‡ Rate per 1,000 personnel per year.

Source: Armed Forces Epidemiological Board, *Injuries in the Military: A Hidden Epidemic*, 1996.

Supplement B. Navy - Naval Health Research Center, Injury Hospitalizations Among Enlisted Personnel

The NHRC provided data on enlisted personnel for CY 1980-1992 using principal diagnosis codes. These data are provided as a supplement to that provided by NMIMC, which used major diagnostic categories to describe hospitalizations for the Navy population.

The Naval Health Research Center hospitalization data are presented in two parts:

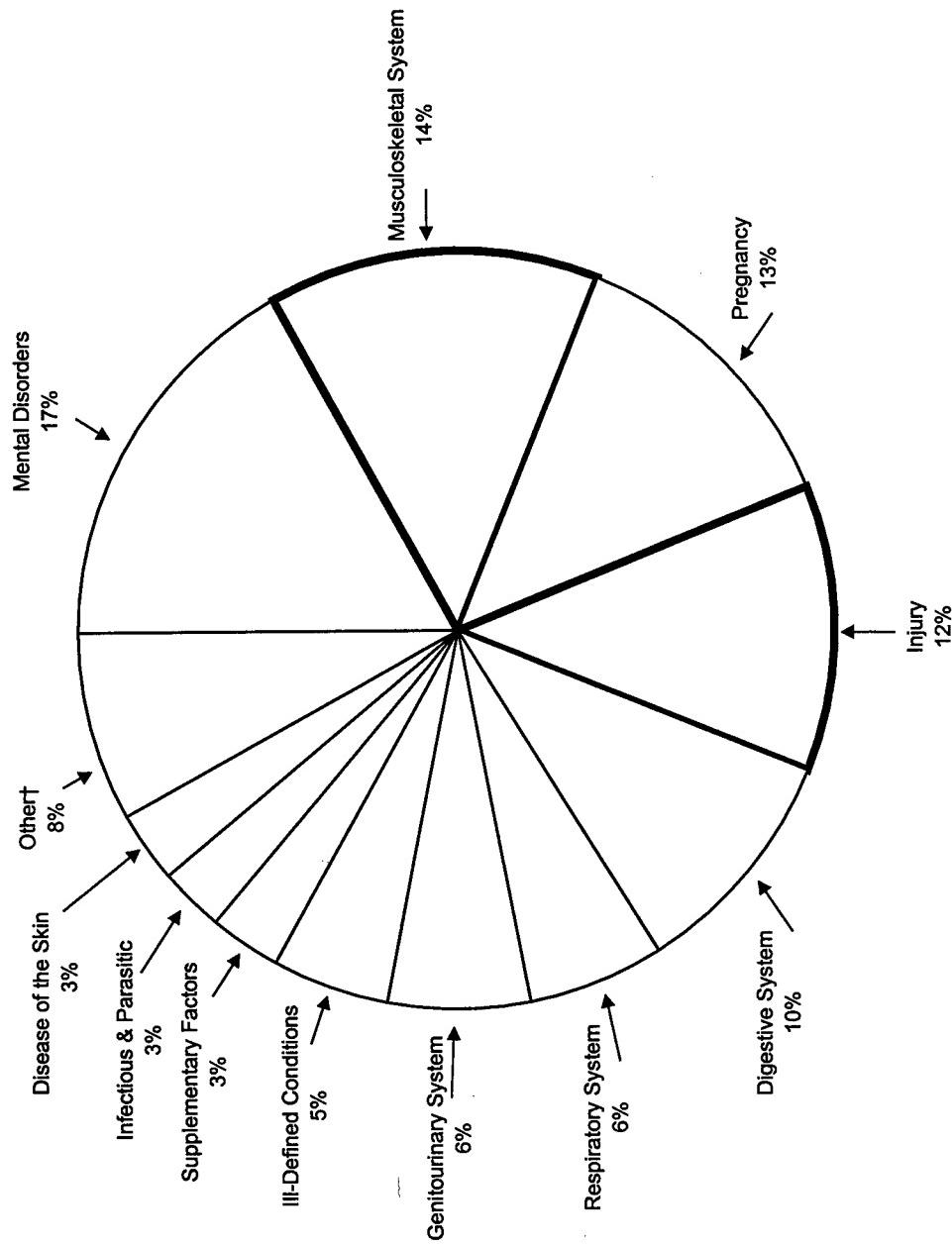
- Magnitude of the Injury Problem Relative to Other Causes of Hospitalization.
 - The distribution of hospitalizations for enlisted personnel by principal diagnosis group for CY 1992 is displayed in Figure 5B-1.
- Trends of Navy Injury-Related Hospitalizations Relative to Other Causes Over Time.
 - The rates of hospitalization by year for CY 1980-1992 are displayed in Figure 5B-2.
 - The rates of hospitalization for the top 10 principal diagnosis groups for CY 1980-1992 are displayed in Figure 5B-3.
 - The rates of musculoskeletal disease and injury for men and women for CY 1980-1992 are displayed in Figure 5B-4.

Magnitude of the Injury Problem Relative to Other Hospitalization Diagnoses

Figure 5B-1 illustrates the distribution of 34,982 hospitalizations by principal diagnosis group for enlisted Navy personnel for CY 1992. The top five contributors to hospitalization were:

- Mental disorders (ICD-9 codes 290-319)—17%.
- Musculoskeletal system (ICD-9 codes 710-739)—14%.
- Pregnancy (ICD-9 codes 630-676)—13%.
- Injury (ICD-9 codes 800-999)—12%.
- Digestive system (ICD-9 codes 520-579)—10%.

Navy - Distribution (%) of Hospitalizations for Enlisted Personnel by Principal Diagnosis Group,* CY 1992



n = 34,982.

* Principal diagnosis groups based on the *International Classification of Diseases*, 9th edition.

† Other includes diagnosis groups accounting for less than 3% of total hospitalization each.

Source: Naval Health Research Center, Navy Hospital Records Database, 1993.

Figure 5B-1

Trends of Navy Injury-Related Hospitalizations Over Time

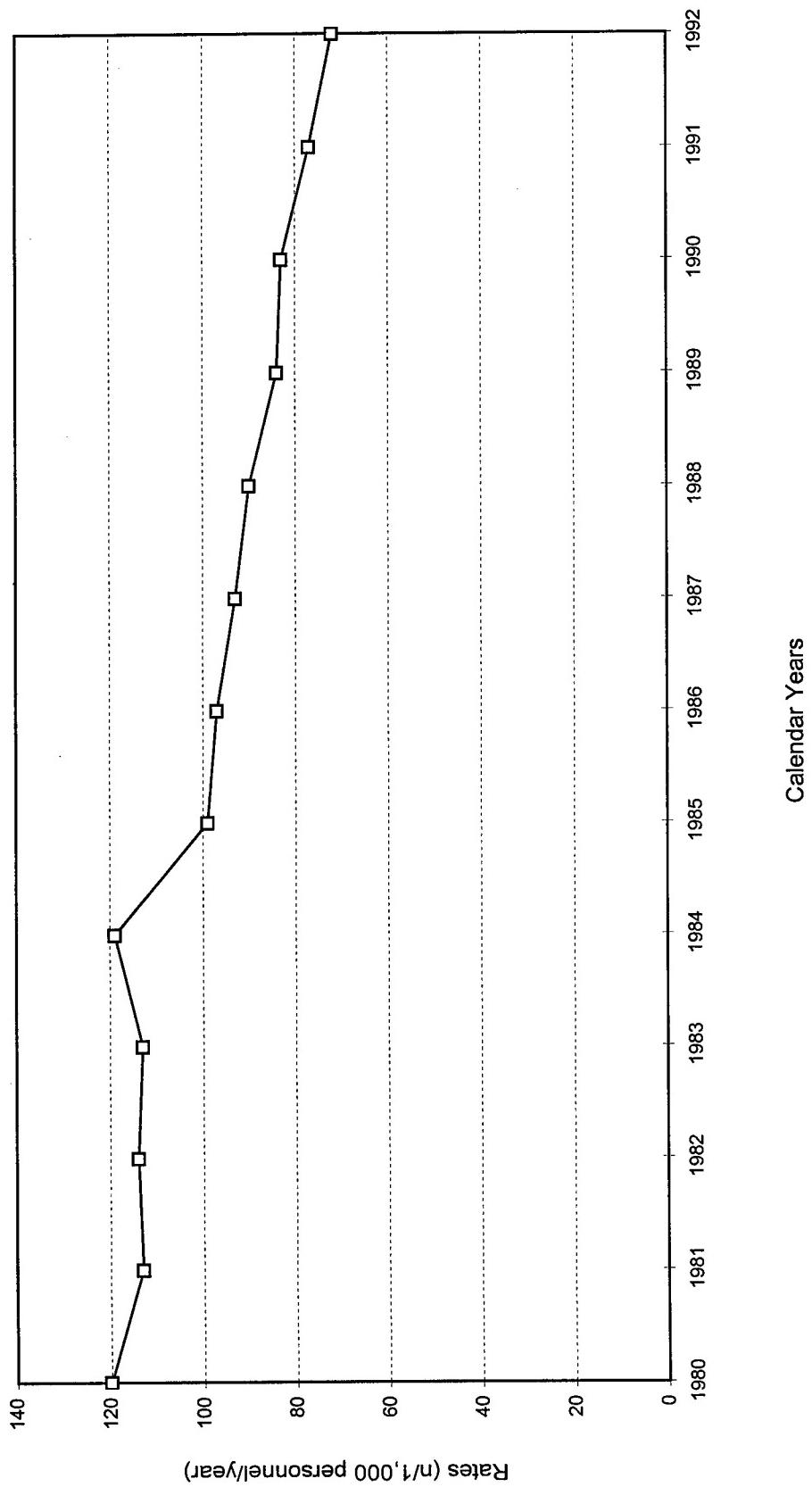
Figure 5B-2 illustrates the rates of hospitalization by year for enlisted Navy personnel for CY 1980-1992. The overall rate decreased 40% from 120 per 1,000 personnel in CY 1980 to 72 per 1,000 personnel in CY 1992.

Worksheet Data for Figure 5B-2

Navy - Rates of Hospitalization by Calendar Year*										1990	1991	1992
1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
120	113	114	113	119	99	97	93	90	84	83	77	72

* Rates per 1,000 personnel.

Navy - Rates of Hospitalization for Enlisted Personnel by Year, CY 1980-1992



Source: Naval Health Research Center, Navy Hospital Records Database, 1993.

Figure 5B-2

Figure 5B-3 illustrates the rates of hospitalization for the top 10 principal diagnosis groups for Navy enlisted personnel for CY 1980-1992.

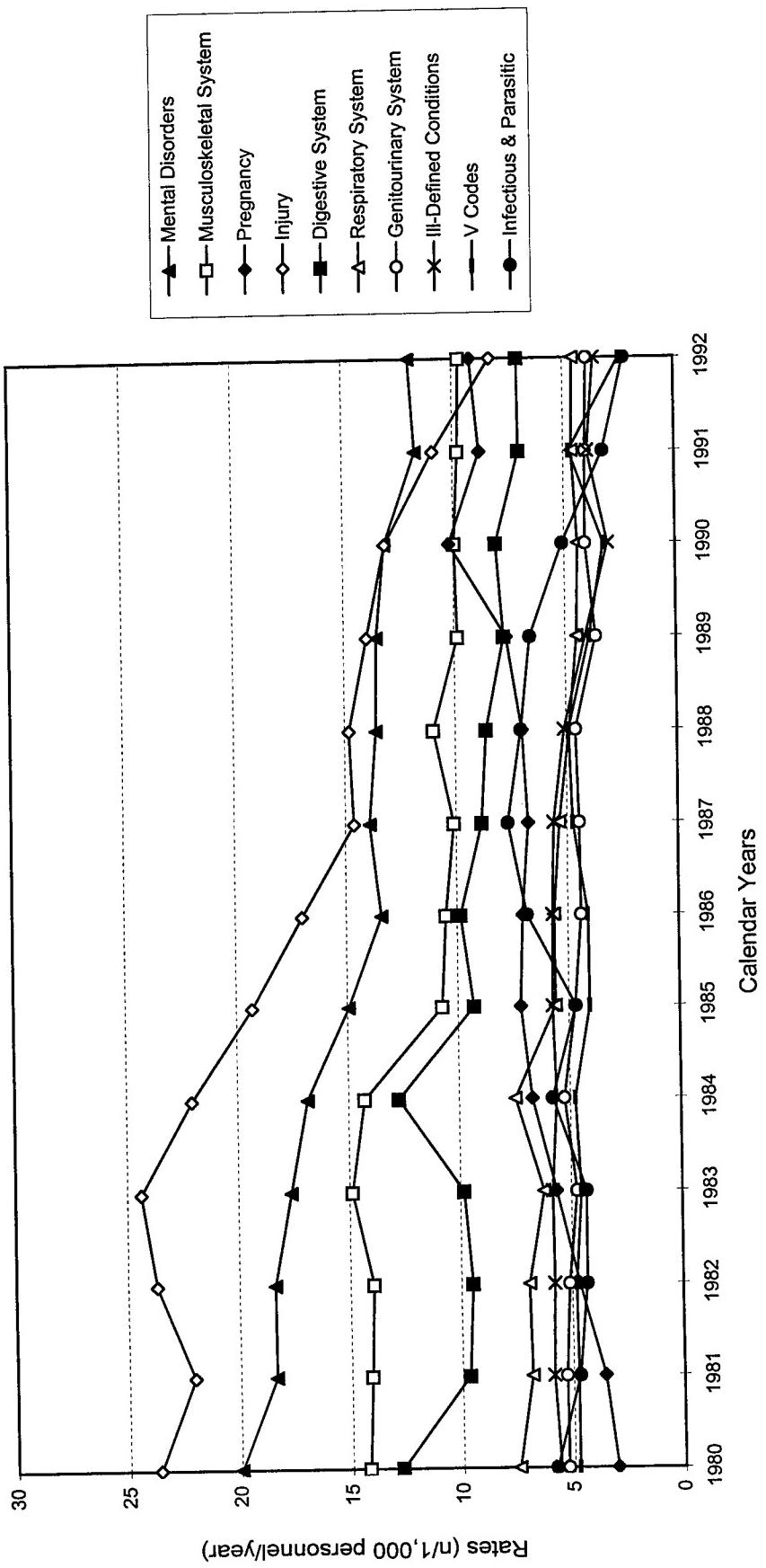
- From CY 1980-1992, injury and musculoskeletal system diseases remained in the top four hospital diagnoses.
- Through the 1980s, injury was consistently the leading cause of hospitalization.
- Through the 1980s, musculoskeletal system diseases were the third leading cause of hospitalizations.
- In CY 1992, musculoskeletal system diseases were the second leading cause of hospitalization (9.7%), having fallen 32% from CY 1980 rates.
- From CY 1980-1992, hospitalizations due to musculoskeletal system diseases decreased 32%.
- From CY 1980-1992, injury hospitalization rates decreased 65%.

Worksheet Data for Figure 5B-3

Top 10 Principal Diagnosis Groups (Rank Based on 1992 Data)	ICD-9 Codes	Navy - Rates of Hospitalization by Calendar Year*												
		1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Mental Disorders	290-319	20.0	18.4	18.4	17.6	16.9	14.9	13.4	13.9	13.6	13.5	13.1	11.7	12.0
Musculoskeletal System	710-739	14.2	14.1	13.9	14.9	14.3	10.7	10.5	10.1	11.0	9.9	10.0	9.8	9.7
Pregnancy	630-676	3.0	3.6	4.7	5.7	6.7	7.2	7.0	6.8	7.0	7.7	10.2	8.8	9.2
Injury	800-999	23.6	22.0	23.7	24.4	22.1	19.3	17.0	14.6	14.8	14.0	13.1	10.9	8.3
Digestive System	520-579	12.7	9.7	9.5	9.8	12.7	9.3	9.8	8.9	8.6	7.8	8.1	7.0	7.1
Respiratory System	460-519	7.5	6.8	6.9	6.2	7.5	5.6	5.6	5.4	4.9	4.5	4.4	4.6	4.6
Genitourinary System	580-629	5.3	5.3	5.1	4.7	5.3	4.7	4.4	4.5	4.6	3.6	4.1	4.0	3.9
Ill-Defined Conditions	780-799	5.6	5.9	5.8	5.8	5.6	5.7	5.7	5.6	5.1	4.1	3.1	3.9	3.6
V Codes	V01-V82	4.8	4.8	4.5	4.8	4.1	4.1	4.7	4.9	3.9	3.2	4.8	2.5	
Infectious & Parasitic	001-139	5.8	4.7	4.3	4.3	5.8	4.7	6.8	7.7	7.1	6.6	5.1	3.2	2.3

*Rates per 1,000 personnel.

Navy - Rates of Hospitalization for the Top 10 Principal Diagnosis Groups* for Enlisted Personnel, CY 1980-1992



* Principal diagnosis groups from the *International Classification of Diseases*, 9th Edition.

Source: Naval Health Research Center, Navy Hospital Records Database, 1993.

Figure 5B-3

Figure 5B-4 illustrates the rates of hospitalization for musculoskeletal system and injury principal diagnosis groups for male and female Navy enlisted personnel for CY 1980-1992.

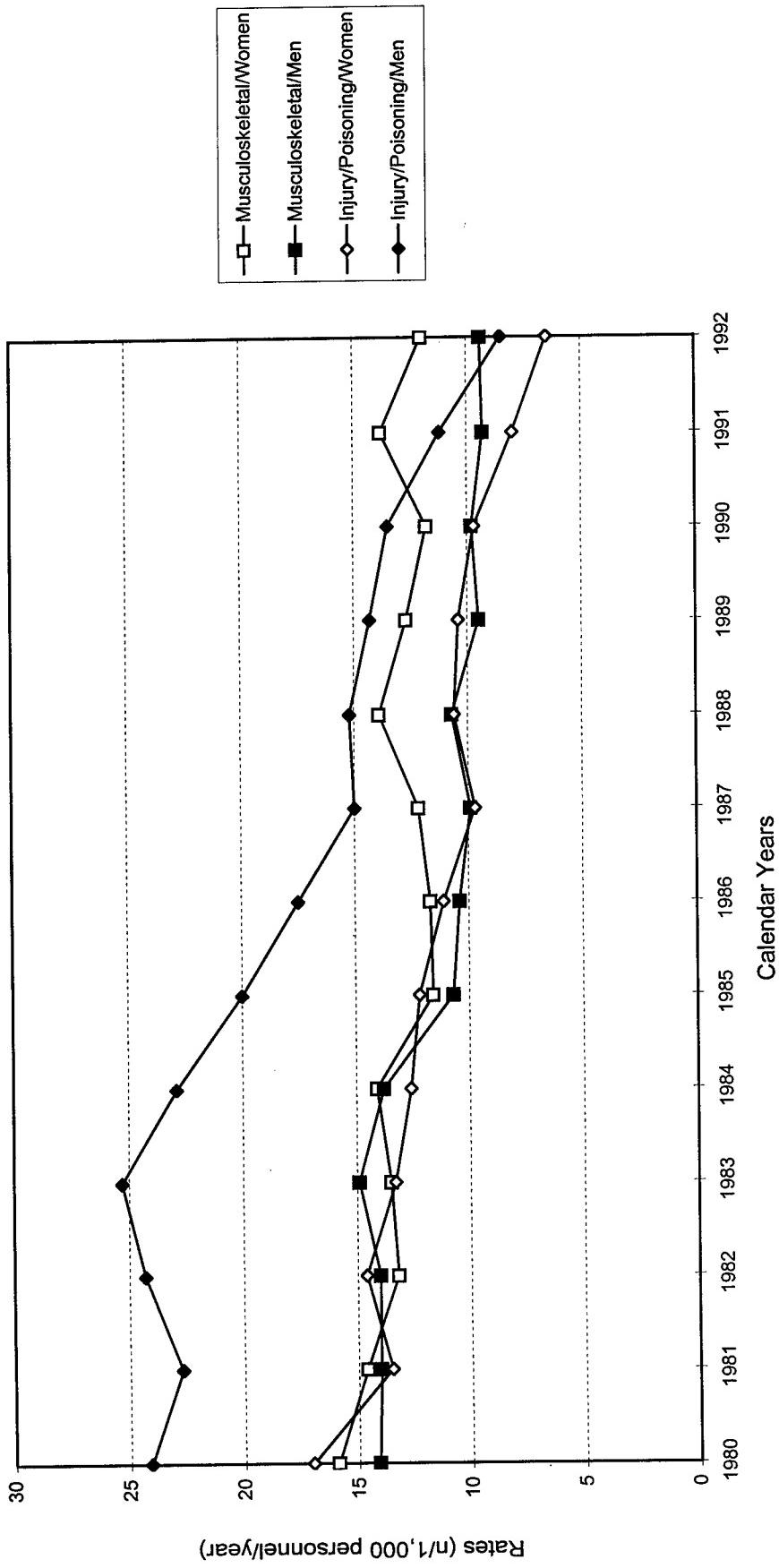
- Musculoskeletal system hospitalization rates for women decreased 25% from 15.9 per 1,000 personnel in CY 1980 to 12.0 per 1,000 personnel in CY 1992.
- Musculoskeletal system hospitalization rates for men decreased 33% from 14.1 per 1,000 personnel in CY 1980 to 9.4 per 1,000 personnel in CY 1992.
- Injury hospitalization rates for women decreased 68% from 17.0 per 1,000 personnel in CY 1980 to 6.5 per 1,000 personnel in CY 1992.
- Injury hospitalization rates for men decreased 65% from 24.1 per 1,000 personnel in CY 1980 to 8.5 per 1,000 personnel in CY 1992.

Worksheet Data for Figure 5B-4

Principal Diagnosis Groups	Navy - Rates of Hospitalization by Calendar Year*						
	1980	1981	1982	1983	1984	1985	1986
Musculoskeletal System—Women	15.9	14.6	13.2	13.5	14.1	11.6	11.7
Musculoskeletal System—Men	14.1	14.0	14.0	14.9	13.8	10.7	10.4
Injury—Women	17.0	13.5	14.6	13.3	12.6	12.2	11.1
Injury—Men	24.1	22.7	24.3	25.3	22.9	20.0	17.5

* Rates per 1,000 personnel.

Navy - Rates of Hospitalization for Musculoskeletal System and Injury Principal Diagnosis Groups* for Male and Female Enlisted Personnel, CY 1980-1992



* Principal diagnosis groups from the *International Classification of Diseases*, 9th Edition.

Source: Naval Health Research Center, Navy Hospital Records Database, 1993.

Figure 5B-4